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Item
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Development Concept Plan
Environmental Assessment
August 1993

⑥

⑤ U.S. Dept. of Interior



Zion Canyon Headquarters
Zion National Park, Utah

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Prepared by:

Branch of Planning
Rocky Mountain Region
National Park Service
Department of Interior

C-2

**U.S. DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE
ROCKY MOUNTAIN REGION**

**Zion National Park
Draft Development Concept Plan
Environmental Assessment
Zion Canyon Headquarters**

The National Park Service has evaluated four alternatives for the future management, use and development of Zion Canyon Headquarters in Zion National Park. The alternatives represent a range of options including a no-action alternative, which would continue existing management and visitor-use activities; alternative one, which would address actions required to remain within current funding and staffing levels, while attempting to resolve issues and address visitor demands; alternative two, which would remove development from the headquarters area and implement a shuttle system; and the proposal, which would implement a mandatory shuttle bus system based in the Watchman Campground and relocation of visitor center functions.

The environmental consequences of the proposal and other alternatives are fully disclosed in this document. Also included are the results of the public involvement and consultation/coordination that have been conducted thus far.

Address Comments to:

Superintendent
Zion National Park
Springdale, UT 84767-1099

SUMMARY OF THE PROPOSED PLAN AND ALTERNATIVES

Zion National Park is in southern Utah in Washington, Kane, and Iron counties and in the First Congressional District. The study area, referred to as the headquarters area, incorporates the development zone from the south entrance station north to the Zion Canyon bridge. This includes the visitor center, the Watchman and South campgrounds, the amphitheaters, the nature center, the Oak Creek, Watchman, and Pine Creek residential areas, and the Oak Creek maintenance area. The study area encompasses approximately 325 acres.

Since the park's *Master Plan* was completed in 1977, visitation has increased dramatically and is impacting facilities and the visitor experience. Issues specific to the headquarters area, many of which are not covered in the 1977 *Master Plan*, have been identified and a new plan for this area is needed. The issue identification process consisted of discussion among park and region staff, and public input through a mail-back brochure. The issues identified include: park visitor facilities, which are inadequate to meet ever-increasing visitor needs and numbers; a resource management program, which is hampered due to a lack of proper facilities and work space; a lack of employee housing and amenities and office space; and maintenance functions that are being performed in an outdated facility.

Four alternatives are analyzed including a no-action alternative and the proposal (the National Park Service's preferred course of action). A number of actions common to all the alternatives that would be implemented for health and safety reasons and for protection of park resources, as funds become available. These include: constructing a bike path, developing a visitor experience and resource protection (VERP) program, relocating the helipad, constructing or renovating buildings to code, removing hazard stones, providing storage areas in all residential areas, constructing flood protection around residences in Oak Creek Canyon, and improving existing facilities to meet accessibility standards.

NO-ACTION ALTERNATIVE

The no-action alternative would continue existing management activities. Existing visitor facilities would be maintained to support current activities and programs. The area would continue to be managed as a multi-use development zone. Day and overnight visitor use, administrative, and employee functions would continue in this area. Routine maintenance would continue. Continued operations under the no-action alternative would result in continued impacts to natural and cultural resources and the visitor experience.

ALTERNATIVE ONE

With the reality that funding for additional employees and new facilities is decreasing and the outlook for future years is not encouraging, alternative one would address those actions park managers would need to take within the headquarters area to stay within current funding and staffing levels while attempting to resolve issues and address visitor demands. These actions include: reducing the hours the visitor center is open, restricting tour buses from stopping at the visitor center during peak hours, implementing a reservation system for the campgrounds and eliminating commercial camping, restricting the number of vehicles allowed in Zion Canyon during peak hours, and expanding the concessioner's shuttle system to operate in the campgrounds. Implementation of alternative one would result in a decrease of 4 to 5 FTEs and would decrease annual operating and maintenance costs by \$200,000. Alternative one would slightly reduce impacts on the natural and cultural resources around the high visitor-use areas. Visitor facilities would remain in the probable maximum flood zone. This alternative is not likely to adversely affect wildlife, floodplain values, or wetlands. Visitor-use patterns would change.

ALTERNATIVE TWO

Alternative two would remove development from the headquarters area and implement a shuttle system. The campgrounds would be completely removed and revegetated. A mandatory shuttle bus system would be implemented through the headquarters area and Zion Canyon, but would be based outside the park on a parcel of BLM land on the edge of the town of Springdale. Some administrative space would be relocated outside the headquarters area, and the visitor center would expand into that space. An emergency services building would be built near the existing administration building. Implementation of alternative two would result in a shift in functions but no change in the number of FTEs. Annual operating and maintenance costs would remain at \$3 million. Construction of roads, trails, and buildings in alternative two would result in a net loss of 1.1 acres of vegetation (0.3 percent of the total study area). Removal of facilities and implementation of the shuttle is expected to result in an overall improvement to park resources and the quality of the visitor's park experience. Implementation of this alternative is not likely to adversely affect wildlife, floodplains, or wetlands.

PROPOSAL

The proposal would implement a mandatory shuttle bus system, which would be based in the Watchman Campground. The visitor center functions would be relocated to the shuttle staging area to provide visitors with information and interpretation at the beginning of their trip. Employee housing, and community and day-care facilities would be provided in the housing areas. An emergency services facility would be built and maintenance facilities would be expanded or added in the existing maintenance area. Implementation of the proposal would increase the park staff level by 3-5 FTEs (to support the

transportation system). Annual operating and maintenance costs would increase by \$250,000. Construction of facilities in the proposal would result in a net loss of 10 acres (3 percent of the total study area) of riparian and pinyon-juniper vegetation. The proposal is not likely to adversely impact wildlife, floodplain values, or wetlands. Implementation of the shuttle system would change the way visitors use the park, but the long-term effects of the proposal are expected to be positive: a reduction in visitor congestion at visitor-use areas, on roads, and along trails, which in turn should contribute to a more fulfilling visitor experience while in the park, protection of intangible resources such as clear night skies, quiet, solitude, and wilderness values.

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TABLE OF CONTENTS

INTRODUCTION	5
PURPOSE OF AND NEED FOR THE PLAN	5
PARK PURPOSE	5
PARK MANAGEMENT OBJECTIVES	6
ISSUES	8
ALTERNATIVES AND THE PROPOSAL	23
NO-ACTION ALTERNATIVE	25
General Management Theme	25
Visitor Use/Development	25
Resource Management	26
Human Resources	27
Park Operations	27
ALTERNATIVE ONE	28
General Management Theme	28
Visitor Use/Development	29
Resource Management	33
Human Resources	33
Park Operations	33
Staffing Requirements	34
Future Plans and Studies Needed	34
Construction Phasing and Costs	34
ALTERNATIVE TWO	36
General Management Theme	36
Visitor Use/Development	36
Resource Management	42
Human Resources	42
Park Operations	42
Staffing Requirements	43
Future Plans and Studies Needed	43
Construction Phasing and Costs	43
PROPOSAL	46
General Management Theme	46
Visitor Use/Development	46
Resource Management	53
Human Resources	53
Park Operations	54
Staffing Requirements	55
Future Plans and Studies Needed	55
Construction Phasing and Costs	55
ALTERNATIVES ELIMINATED FROM DETAILED CONSIDERATION	59
Accommodate Demand Without A Transportation System, By Enlarging and Building Additional Facilities	59

Variations to the Proposal	59
Locate Transit Center at the Existing Visitor Center	59
Locate Transit Center at the Nature Center	59
Locate Transit Center Near Sammy's Canyon	60
Locate the Transit Center (Without Visitor Center) in the Watchman Campground	60
Additional Ways to Limit Visitation to Capacity of Current Facilities/Resources	60
AFFECTED ENVIRONMENT/ENVIRONMENTAL CONSEQUENCES	77
NATURAL RESOURCES	77
Vegetation	77
Existing Conditions	77
Impacts of the No-Action Alternative	77
Impacts of Alternative One	77
Impacts of Alternative Two	78
Impacts of the Proposal	78
Soils	79
Existing Conditions	79
Impacts of the No-Action Alternative	79
Impacts of Alternative One	79
Impacts of Alternative Two	80
Impacts of the Proposal	80
Geology	81
Existing Conditions	81
Impacts of the No-Action Alternative	81
Impacts of Alternative One	82
Impacts of Alternative Two	82
Impacts of the Proposal	82
Threatened and Endangered Species	82
Existing Conditions	82
Impacts of the No-Action Alternative	84
Impacts of Alternative One	84
Impacts of Alternative Two	84
Impacts of the Proposal	85
Wildlife	85
Existing Conditions	85
Impacts of the No-Action Alternative	85
Impacts of Alternative One	85
Impacts of Alternative Two	86
Impacts of the Proposal	86
Water Resources/Floodplains/Wetlands	86
Existing Conditions	86
Impacts of the No-Action Alternative	87
Impacts of Alternative One	88
Impacts of Alternative Two	88

Impacts of the Proposal	89
Wilderness	91
Existing Conditions	91
Impacts of the No-Action Alternative	91
Impacts of Alternative One	91
Impacts of Alternative Two	91
Impacts of the Proposal	91
Air Quality	92
Existing Conditions	92
Impacts of the No-Action Alternative	92
Impacts of Alternative One	92
Impacts of Alternative Two	92
Impacts of the Proposal	92
Visual Resources	93
Existing Conditions	93
Impacts of the No-Action Alternative	93
Impacts of Alternative One	93
Impacts of Alternative Two	93
Impacts of the Proposal	93
Noise Quality	94
Existing Conditions	94
Impacts of the No-Action Alternative	94
Impacts of Alternative One	94
Impacts of Alternative Two	94
Impacts of the Proposal	95
CULTURAL RESOURCES	95
Archeological Resources	95
Existing Conditions	95
Impacts of the No-Action Alternative	96
Impacts of Alternative One	96
Impacts of Alternative Two	96
Impacts of the Proposal	96
Historic Structures	97
Existing Conditions	97
Impacts of the No-Action Alternative	99
Impacts of Alternative One	99
Impacts of Alternative Two	100
Impacts of the Proposal	100
Ethnographic Resources	102
Existing Conditions	102
Impacts of the No-Action Alternative	102
Impacts of Alternative One	102
Impacts of Alternative Two	102
Impacts of the Proposal	102
VISITOR USE	103
Existing Conditions	103

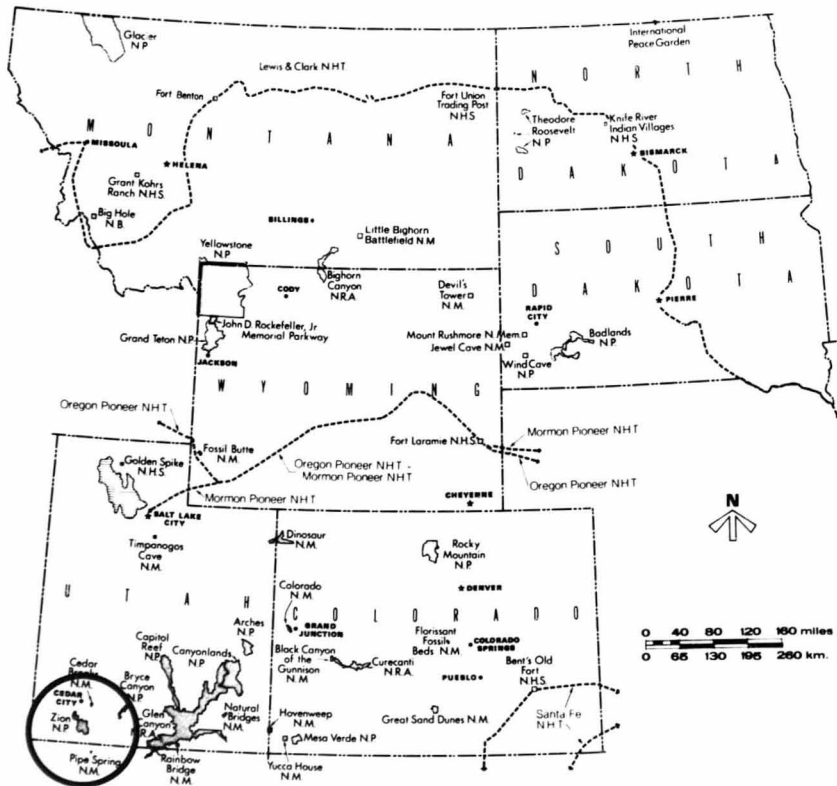
Impacts of the No-Action Alternative	104
Impacts of Alternative One	104
Impacts of Alternative Two	105
Impacts of the Proposal	106
SOCIOECONOMIC RESOURCES/REGIONAL LAND USE	107
Existing Conditions	107
Impacts of the No-Action Alternative	108
Impacts of Alternative One	108
Impacts of Alternative Two	108
Impacts of the Proposal	109
Cumulative Effects of the Proposal	110
CONSULTATION/COORDINATION	113
LIST OF PREPARERS	115
REFERENCES	117
APPENDICES	
Appendix 1 - Park Significance Statements (121)	
Appendix 2 - Vegetation Map (125)	
Appendix 3 - Soils Map (129)	
Appendix 4 - Geological Hazards Map (133)	
Appendix 5 - U.S. Fish and Wildlife Letter (137)	
Appendix 6 - Floodplains Map (141)	
Appendix 7 - Historic Structures Map (145)	
Appendix 8 - Building Square Footage Requirements (149)	
GRAPHICS	
Region Map (1)	
Vicinity Map (2)	
Study Area Map (3)	
Existing Conditions Map (21)	
Alternative One DCP Map (31)	
Alternative Two DCP Map (37)	
Shuttle Stops - Alternative Two (39)	
Proposal DCP Map (47)	
Shuttle Stops - Proposal (49)	
Visitation Graphs (103)	
Vegetation Map - Appendix 2 (127)	
Soils Map - Appendix 3 (131)	
Geologic Hazards Map - Appendix 4 (135)	
Floodplains Map - Appendix 6 (143)	
Historic Structures Map - Appendix 7 (147)	

TABLES

1. Development Cost Estimate, Alternative One (35)
2. Development Cost Estimate, Alternative Two (44)
3. Development Cost Estimate, Proposal (56)
4. Summary Comparison of Alternatives (62)
5. Summary of Environmental Consequences (66)

PHOTOGRAPHS

- Bridge Mountain and The Great White Throne (4)
- Zion National Park Headquarters Area (4)
- South Entrance (15)
- Visitor Center (15)
- Oak Creek Housing (16)
- Watchman Housing (16)
- Maintenance Buildings (17)
- Nature Center (18)
- South Campground (18)
- Watchman Campground from Watchman Trail (19)

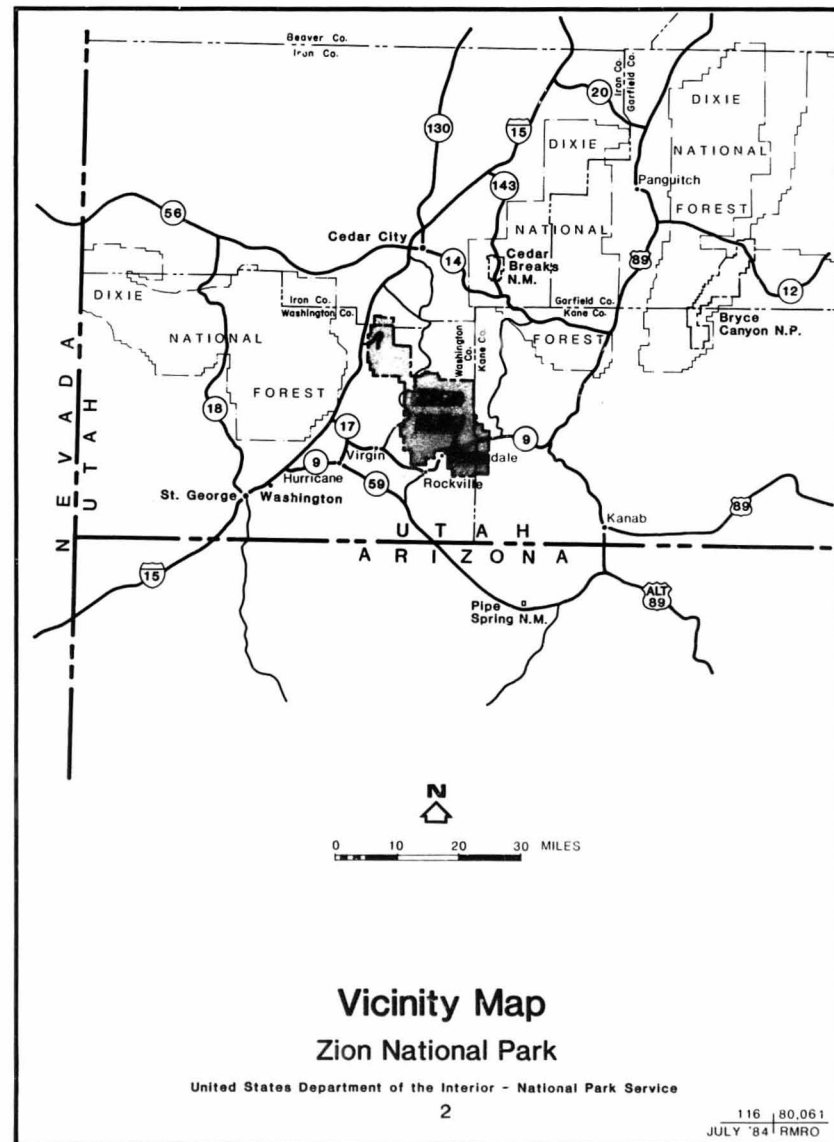


Legend

- Locations of Major Cities
- Locations of State Capitals
- State Boundary Lines
- National Park Service Areas
- National Park Service Historical Trails

ROCKY MOUNTAIN REGION

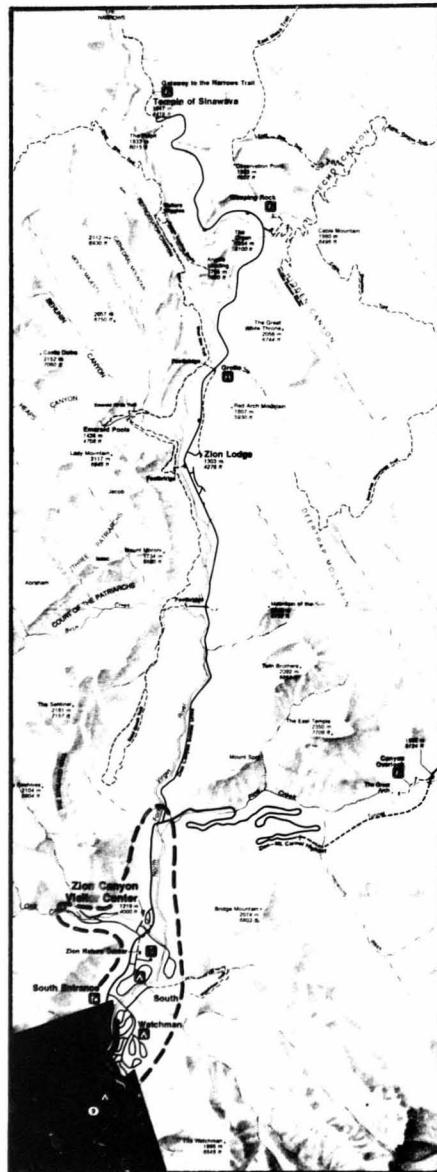
National Park Service
United States Department of the Interior



Vicinity Map

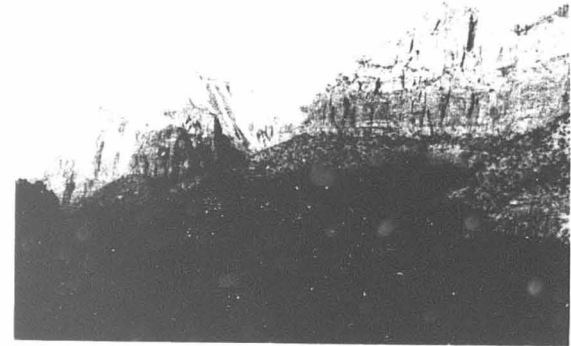
Zion National Park

United States Department of the Interior - National Park Service



Study Area
 Zion National Park
 United States Department of the Interior
 National Park Service

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INTRODUCTION

Zion National Park is in southern Utah in Washington, Kane, and Iron counties and in the First Congressional District. The study area is in Washington County, in the natural region of the United States known as the Colorado Plateau, which is characterized by large plateaus bounded by receding escarpments. It is the arid climate, spasmodic rainfall, and the three rivers dissecting the Colorado Plateau - the Colorado, the Escalante, and the San Juan, that have created a landscape of canyons of extraordinary geologic interest and scenic beauty.

The study area, referred to as the headquarters area, incorporates the area from the south entrance station north to the Zion Canyon bridge. This includes the visitor center, the Watchman and South campgrounds, the amphitheaters, the nature center, the Oak Creek, Watchman, and Pine Creek residential areas, and the Oak Creek maintenance area. The study area encompasses approximately 325 acres. It includes a development zone (107 acres) and a natural zone (218 acres), and is surrounded by a proposed wilderness subzone.

PURPOSE OF AND NEED FOR THE PLAN

A *Master Plan*, which prescribed the management philosophy for the park and how areas would be used was prepared for Zion National Park in 1977. Since that time, visitation has grown dramatically and is impacting facilities and the visitor experience. Issues specific to the headquarters area, many of which are not covered in *1977 Master Plan*, have been identified. Therefore, a new plan for this area is needed.

The purpose of this development concept plan is to address the obstacles preventing park managers from achieving the park's management objectives and desired future conditions for the headquarters area, and to propose management and development solutions. Alternative development solutions will be presented in a conceptual format, which will then be used as the basis for preparing detailed site and building design/construction documents. An environmental assessment that addresses the impacts of the proposed plan and alternatives on the natural and cultural resources of the study area is included as part of this document.

PARK PURPOSE

The erosional features of the area were originally protected by Presidential Proclamation No. 877 on July 31, 1909, when President Taft established Mukuntuweap National Monument. In 1918, the monument was enlarged and the name was changed to Zion

Zion Canyon Headquarters DCP/EA

National Monument and in 1919, the monument received national park status. Zion National Park was established, as defined in the enabling legislation, to:

Preserve the dynamic natural processes of canyon formation as an extraordinary example of canyon erosion.

Preserve and protect the scenic beauty and unique geologic features: the labyrinth of remarkable canyons, volcanic phenomena, fossiliferous deposits, brilliantly colored strata, and rare sedimentation.

Preserve the archeological features that pertain to the prehistoric races of America and to the ancestral Indian tribes.

Provide a variety of opportunities for visitors to learn about and enjoy the resources without degrading those resources.

Preserve park resources for scientific research.

The special characteristics that give significance to this area as a national park include the geological formations, the brilliantly colored sandstone cliffs, the free-flowing river system, the diverse topography and elevations, the existence of rare, endangered, and endemic species, remarkable examples of depression-era construction projects, evidence of the interrelationship between the Anasazi and Fremont Indian cultures, the accessibility of geologic and scenic resources to a wide range of people with differing interests as well as physical abilities, the region's clean air, the unimpaired views of the scenic resources, the fabulous night skies, and the extremely low levels of background sound. A complete list of Zion's statements of significance is in appendix 1.

PARK MANAGEMENT OBJECTIVES

The park management objectives are statements of the desired future conditions towards which park management is working. These conditions are based on the purpose of the park and its significant characteristics, and describe desired ends rather than specific solutions or means for accomplishing those ends. The following management objectives guided the preparation and analysis of the development plan for the headquarters area.

The natural beauty of the park is intact (unimpaired) and visitors are given a highly enjoyable park experience in terms of scenic, educational, and spiritual insights.

Zion National Park is a balanced, biologically diverse environment.

Visitors are able to choose from and participate in a variety of compatible activities that are educational as well as fun.

Introduction

All visitors leave the park with a basic understanding of Zion's primary significance and their role in helping to preserve Zion National Park, with a recognition that national parks are critical parts of the American scene, and with a commitment to protect them.

Visitors can find places of solitude and quiet in the canyon.

The park provides a variety of opportunities for experiencing the backcountry, where solitude is a primary concern.

Every visitor entering the park has an opportunity for quality contact with park personnel.

There is no traffic congestion, vehicular access to the park is strictly limited.

Visitor, concession, and administration facilities and functions are sized to ensure non-degradation of the resource.

Zion is recognized and valued worldwide as an outstanding example of balance between preservation and use.

All information on cultural and natural resources is collected and documented, and given equal emphasis and efforts.

A resource management program is in place and is a model for national and international resource managers.

An active, viable research program is in place, including adequate facilities for research staff.

Federal and state officials clearly understand the economic value of Zion National Park to state and national economies and support its needs.

The Utah Travel Council, local travel groups, the chambers of commerce, and travel industry businesses are assisting in efforts to contribute dollars to Utah national park budgets, to offset additional demands caused by increased visitation.

Concessioners and cooperating associations are aware of and share the NPS vision and philosophy in all parts of their operations. The concessioner has excellent staff and provides quality service to the visitor. The Zion National History Association continues to provide Zion National Park with full support.

Zion Canyon Headquarters DCP/EA

A fee system is in place requiring only one fee to be collected.

All needed action plans are completed.

Planning and management actions are taken to stay ahead of the curve, keeping crisis and catch-up management actions at a minimum.

An atmosphere of cooperation with all park neighbors exists, and resolution of all inholder interests has been accomplished.

The park has a competent, knowledgeable work force of adequate size, which is appropriately paid and housed.

Employee support facilities are adequate - housing, office, wellness/fitness center, day care.

State-of-the-art computer technologies are in place.

Appropriate and adequate infrastructure is in place.

Facility and project funding needs are identified and requests are in place in the fiscal system.

The visitor and employee safety program is well-organized and keeps accidents and incidents to a minimum.

ISSUES

The issue identification process consisted of discussion among park and region staff, and public input through a mail-back brochure. The following issues have been identified as obstacles to successfully achieving and maintaining park management goals and objectives.

Visitor Use - Park visitor facilities are inadequate to meet visitor needs and numbers. Increasing visitation numbers have resulted in crowded conditions, overuse and degradation of facilities, damage to natural and cultural resources, and to a diminished visitor experience. The visitor center, nature center, campgrounds, park roads, trails, and picnic areas are the facilities of concern. Alternatives for providing facilities that accommodate visitor needs, provide opportunities for a quality recreational experience, and protect the park's natural and cultural resources need to be addressed.

Owing to its spectacular scenic attractions, hiking opportunities, and lodging facilities, the 7-mile drive through Zion Canyon has always been the visitor focus of the park. However, many visitors cannot find parking at the trailheads or points-of-interest because of the sheer number of vehicles. When that happens, visitors either park illegally on the side of the road, impacting the vegetation and creating potential traffic hazards, or leave the Canyon without ever experiencing the resources they came to see. This is not the visitor experience or condition park managers want to promote.

The 1977 *Zion National Park Master Plan* proposed implementation of a shuttle system in Zion Canyon as a solution to the congestion problem. The plan proposed that the shuttle staging area be located within the vicinity of headquarters. Park managers support the idea of alternative means of transportation, but their ability to fully promote or implement them is hindered because no related infrastructure exists. This document will analyze the feasibility, in terms of physical requirements and spatial relationships to other uses, of providing a shuttle system as proposed in the master plan to help reduce congestion in the canyon.

Over the past ten years the park has been experiencing a consistent increase in visitation, which is projected to continue. In 1992, over 2.68 million people visited Zion National Park. Forty percent of them stop at the visitor center during their trip to the park. This has increased demand on that facility, to the point where demand can no longer be accommodated. The visitor center is open every day of the year, and during the peak visitor season it operates from 8 a.m. to 8 p.m. During the peak season, an average of 5,000 visitors use the visitor center every day. With that number of people using the facility, visitors often end up standing two to three deep at the information desk, awaiting orientation and hiking information. Tour buses, which drop off an average of 40 people at the visitor center at one time, also add to the congestion. As visitation has increased over the years, the services offered in the visitor center have also expanded, and the area originally intended to be a lobby has evolved into the Zion National History Association (ZNHA) book sales area, reducing the capacity of the visitor center. Also, the layout of the visitor center space is not conducive to efficiently moving visitors through, which compounds the congestion problem. Because of the space limitations and area layout, the visitor center gets very crowded and visitors leave the facility without receiving the information they desire or without having had the opportunity to fully benefit from the services available to them. In addition, an unknown number of visitors don't even have the opportunity to get into the visitor center because they are unable to find an available parking space. The number of rest rooms is also inadequate to accommodate the number of visitors, as evidenced by the long lines typically found forming outside.

Another visitor facility, the nature center, is used daily throughout the peak visitor-use season, for the Junior Ranger Program. This is an educational program where children spend a day learning about the natural and cultural resources in the park. Picnicking outside of the building by other visitors disturbs participants in this program, reducing its effectiveness. Because there are no designated picnic sites in the study area and the

nature center grounds are open and accessible, they are used extensively for picnicking. It is not uncommon to have bus loads of visitors using this area for picnicking at the same time. The heavy use of the grounds by picnickers has negatively impacted natural resources. Alternatives for mitigating use conflicts and impacts to natural resources will be addressed by this plan.

The campgrounds include 381 sites, which are full from April through October. Sites are occupied on a first-come first-served basis, which results in visitors coming to the park without knowing whether or not they will be able to find a campsite for the night. Because of the first-come first-served system, there are visitors driving through the campgrounds at all hours looking for a vacant site. This disturbs the campers who have a site, results in more people in the campground than there is capacity for, and forces some visitors to unexpectedly have to search for overnight lodging elsewhere in or outside the park. In addition, the intensive use of the campsites and poor layout of roads and sites has resulted in circulation problems and damage to the vegetation. There is little separation of sites or delineation of parking pads. Pulloffs are not designed for larger vehicles, and there are no designated tent pads. This has resulted in uncontrolled vehicular access to most campsites, people driving over vegetation, placing tents and trailers haphazardly throughout the area, and generally degrading the visual quality of the campgrounds.

The practice of visitors pulling off of the road to look at spectacular views has resulted in the informal designation of several pulloffs. Pulling off of the road is easy to do because the main road was designed without curbing, in order to allow rain and snowmelt to flow unrestricted off the road into drainage ditches. The practice has resulted in damage to roadside vegetation, and alternatives for mitigating this damage should be analyzed.

Resource Management - The resource management program and activities are hampered by a lack of proper facilities and work space. Alternatives for providing facilities adequate to carry out the goals of the resource management program need to be addressed.

The park resource management and research division is involved in vegetation research and revegetation of disturbed areas within the park, which requires access to a supply of native plant material. The park's current plant-holding facility, a small area within the maintenance yard, does not meet this need because of its restricted location and makeshift construction. In addition, the resource management workshop is in a small shed in the maintenance yard and is not large enough to cultivate the quantity of seed stock required for revegetation. A plant-drying rack used by the resource managers has been set up in a hallway in the administration building because of lack of any other space. This lack of work space and subsequent displacement of functions to various locations in the park seriously limits the progress and success of the resource management program.

Conducting scientific research is a park objective, but allowing visiting researchers into the park and implementing the program is precluded because all work and office space in the administrative building is being used by park staff and there is no housing available to offer researchers.

The visitor center, housing areas, and nature center are irrigated by a pressurized automatic system using potable water. This is an expensive source of water and a wasteful method of irrigation. In addition, the campgrounds are irrigated by an open ditch system using river water. This system is inefficient, outdated, and is not adequately irrigating the vegetation. Compounding the problem is the annual intensive use the area gets, which reduces the vegetation's chances of prospering. This combination of conditions has resulted in little regeneration of plant materials. Alternatives for effectively and efficiently maintaining the vegetation in the headquarters area need to be addressed.

Human Resources - Housing, in and outside the park, and recreational and personal amenities available to employees are very limited. This has impacted recruitment efforts, and has resulted in inadequate staffing levels, a high turnover rate, personal hardship, and low employee morale and effectiveness. Alternatives for providing adequate employee facilities and services need to be addressed.

The amount of housing in the headquarters area does not fulfill the demand by park employees. Compounding the problem is the fact that there is very little housing available outside the park within a reasonable commuting distance. A survey of the housing market from Springdale, Utah, to St. George, Utah, a distance of 40 miles, was conducted by the National Park Service in the fall of 1992. The towns between the park and St. George include Hurricane, Virgin, Rockville, and Springdale, all of which have populations below 500. According to that survey, seasonal employees are most affected by the shortage of available rental and short-term housing. However, the supply of housing for purchase by permanent employees is also limited and beyond affordability for an estimated 90 percent of permanent park employees. The shortage of housing in and out of the park has impacted park recruitment efforts because people aren't willing to accept a position if housing cannot be secured. This has also resulted in a higher than desired turnover rate of employees and inadequate staffing levels.

Community facilities typically found in non-NPS residential communities, such as fitness areas, recreation facilities, and community meeting halls are not available in the park housing areas and are very limited in the communities within a reasonable commuting distance. Recreational facilities for park personnel living in the park include one abandoned tennis court pad in the Watchman housing area, and a playground each in the Watchman and Oak Creek housing areas. Currently, the nature center and adjacent open area are used for personnel-related functions, however, this conflicts and interferes with visitor use. Community facilities are an important element of any residential community, providing valuable social and recreational services to community residents.

The lack of facilities in or near the park deprives park personnel of amenities normally found in residential communities and diminishes morale.

There are many families working in the park who would make use of a day-care facility during the work week, however, there is no such facility in the park or in the nearby communities. Park managers feel this impacts employees' morale, results in high turnover, and impacts the park's recruiting efforts, making it difficult to attract potential employees who have families and would require such a service.

The design of the existing employee housing units does not provide for adequate storage space. People are therefore forced to throw away, give away, sell, or store their personal items in their yards, or at locations outside the park. The closest public storage area is 25 miles away and vacant space is at a premium.

Park Operations - There are more personnel working in the headquarters building than there is office space available, facilities for employee training are limited, visitor protection facilities are not available, interpretive storage space is spread throughout the headquarters area, and maintenance functions are being performed in an outdated facility. All these inadequacies have resulted in less efficient operations, loss of materials, and increased costs to the park. Alternatives for providing adequate facilities in which to perform required functions need to be addressed.

Work space requirements for staff members in the administrative building have outgrown the amount of office space in the building. Almost all divisions are cramped for space and compete with each other for space. Not only has this resulted in placement of a temporary building behind the visitor center to house resource management staff, and more staff vehicles than available parking spaces, it reduces the efficiency of park operations.

Training for park personnel is held in the nature center in the off-season, when the Junior Ranger Program is not in session and there are limited alternative spaces for holding training. This restricts opportunities for training at the park when it is most needed -- at the beginning of the peak visitor season and throughout the summer. As a result, employees are sent out of the park for training, which park managers feel has reduced the quality and effectiveness of the training being received, and which is also more costly than in-park training.

Emergency services such as law enforcement, search and rescue, wildland and structural fire protection, resource protection, and animal impoundment, are hampered because of nonexistent and outdated facilities. This results in operational inefficiencies and ultimately an increased response time to emergencies. Personnel, equipment, and vehicles are dispersed throughout the headquarters area. Emergency service personnel work from the administration building, however most of the emergency vehicles and equipment are

Introduction

in the maintenance area. The firehouse, housing one fire-fighting vehicle, and the search and rescue cache are in the maintenance yard. This is not an optimal location for housing the fire truck. Flammables are stored in the maintenance yard and the potential exists for fire in this area to block access to the fire-fighting equipment. Also, the park is getting a new fire truck to replace the existing one, and it will be too large to fit in the existing firehouse. The remaining emergency service vehicles (an ambulance, wildland fire and tunnel rescue vehicles) are parked outside of the administration building, exposed to extremes of weather conditions. The fire cache is a metal shed, which is too small for all equipment needs. This requires equipment to be stored in alternate locations. The dispersal of equipment and vehicles presents accountability problems because of the number of persons having access to items. It also creates inventory control problems including over-stocking of some items. The emergency services division is also responsible for impounding domestic animals, but there is no place to hold them that does not interfere with other park operations.

The helipad is used by those performing emergency services and wildlife or fire monitoring. It is near the Watchman housing in a fairly flat area, and because of its proximity to the housing area, it does not meet minimum DOI Office of Aircraft Services (OAS) safety standards and alternative locations should be analyzed.

Park rangers are required to participate in a fitness program, however, neither the park nor communities within a 50-mile radius of the park have fitness facilities. Lack of facilities make it difficult for rangers to participate in the fitness program.

Park brochures and newspapers are being stored in three residential garages in the Oak Creek housing area. This use eliminates the occupants' use of the garages for vehicle storage, compounding the personal storage and housing problem. The administration building is full and cannot accommodate storage of this material, and there is no other space available for storage. The need to constantly retrieve material from outlying locations results in less efficient operations for the interpretive division.

Although the maintenance complex includes an auto shop for repairing vehicles and equipment, large vehicles or equipment (dump trucks, end loaders, graders) cannot fit into the shop, and maintenance workers must work on these vehicles outside. Because of the extremes of temperatures that occur in this part of the country and the physically demanding nature of maintenance functions, this is neither a good nor a safe situation.

The maintenance complex also includes a shop, lumber storage shed, warehouse, and a flammable storage shed, all of which are filled to capacity. Employees are competing for work and storage space so they can efficiently and effectively perform their functions. Vehicles and equipment are parked overnight in the yard near the auto shop and warehouse and are often in the way of maintenance operations. Excess park property is stored in a three-sided shed, which is filled to capacity, unsecured, and susceptible to theft. Construction materials, new and used, are stored at the east end of the yard at the

Zion Canyon Headquarters DCP/EA

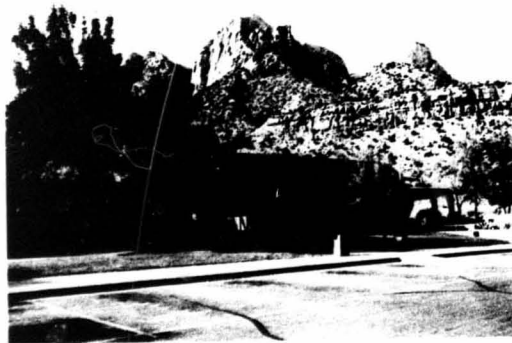
old wastewater treatment plant, and in Sammy's Canyon. This is inefficient and inconvenient for maintenance workers. One of the residential garages in the Oak Creek housing area is used for storing old furniture, which precludes use by the residents for parking or storage.

The park is not meeting state or federal EPA standards because of the lack of room for proper storage of fuel and waste oil and disposal of wastewater when vehicles are washed. The park would like to initiate a recycling program, but there is no space to store recyclables until they can be transported outside the park. Explosives are stored in Oak Creek Canyon, outside the maintenance area in buildings that do not meet code. They are difficult to get to in the winter because the road is not paved.

Employee parking is outside the maintenance complex, but more vehicles are parked there than there are designated parking spaces. This has resulted in damage to the natural resources along the roadway.



South Entrance



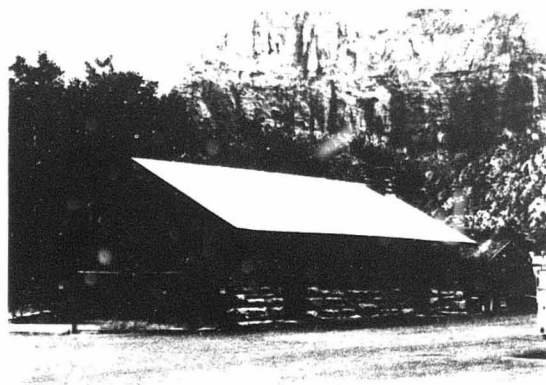
Visitor Center



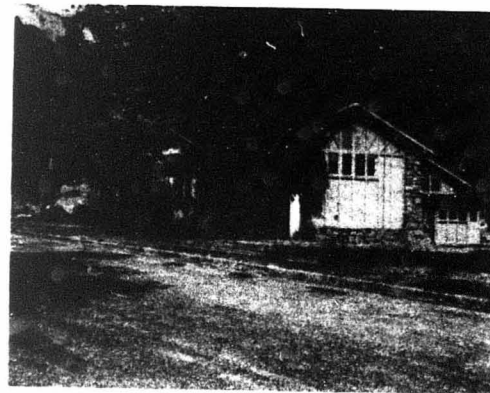
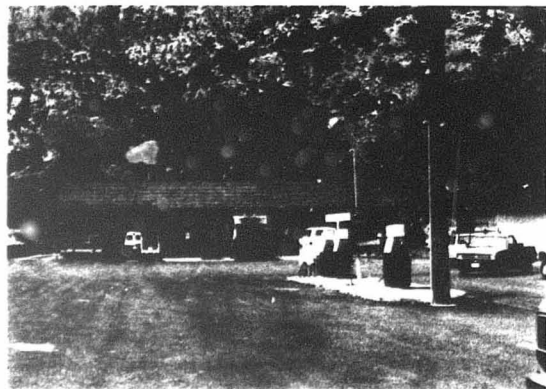
Oak Creek Housing



Watchman Housing



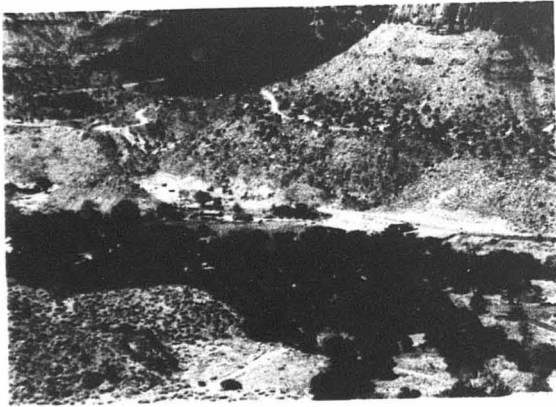
Maintenance Buildings



Nature Center



South Campground



Watchman Campground from Watchman Trail

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ALTERNATIVES AND THE PROPOSAL

Four alternatives are analyzed including a no-action alternative and the proposal. The proposal presented in this chapter constitutes the National Park Service's preferred course of action for development within the headquarters area. These alternatives are described below.

There are some actions common to all the alternatives that would be implemented as funds become available. These include:

Construct a bike path through the study area. The Denver Service Center (DSC), National Park Service, is in the process of preparing a development concept plan/environmental assessment for a bicycle path through the study area. Construction of the trail is planned for the fall of 1993. Therefore, throughout this document, the bike trail will be considered and referred to as "under construction." The bike path would promote alternative means of transportation through the park. It would begin at the south entrance station and run parallel to the river. Much of the path would be constructed on existing roads or paths and would require river crossings. Vehicular traffic volume during the peak season would be reduced on this road in alternatives one, two, and the proposal, and bicyclists would share the road with the shuttle buses, lodge patrons, park and concession employees, and service vehicles. The path would be designed to Uniform Federal Accessibility Standards (UFAS). Refer to the DSC document for detailed and cost information.

Implement a visitor experience and resource protection (VERP) program. Based on the purpose of the park and the management objectives as outlined in this document, the development concept plan alternatives attempt to balance visitor demand and all infrastructure needs with efforts to preserve and protect natural and cultural resources. While such a balance does not equate to satisfying 100 percent of visitor demand, it does come closer to ensuring a positive visitor experience for those involved. This document in and of itself is no guarantee that the park will achieve all of its management objectives; however, along with a monitoring program, such as a visitor experience and resource protection process (VERP), the park will come closer to accomplishing and maintaining all of its management objectives. In view of changing resource conditions, visitor demands, administrative needs, and funding levels, visitor-use and management actions must be constantly monitored to ensure that their direction is accurate, therefore, a visitor experience and resource protection process would be implemented by park managers.

To help park managers monitor and determine whether or not the park's management objectives are not being met, a visitor experience and resource protection program would be developed. The visitor experience and resource protection program is a management tool to alert park managers that management objectives are not being met or maintained and that changes in management operations or visitor use are needed. The program is

similar to the USDA Forest Service's limits of acceptable change (LAC) planning system and the NPCA's visitor impact management (VIM) process. All of these programs emphasize the conditions desired in an area rather than an amount of use an area can tolerate. They require managers to define a desired condition and to undertake actions to achieve and maintain them. Development of the program would include public input and include the following steps.

1. Specification of acceptable and desired resource and social conditions that reflect management objectives and the park purpose, by management zone.
2. Selection of specific key physical, social, or ecological impact indicators that become baselines for determining whether or not management objectives are being met (following step).
3. Comparison of desired to existing conditions, using the established impact indicators to determine consistency with, or causes of discrepancies from, the desired resource and social conditions.
4. Identification and implementation of management actions necessary to achieve desired conditions.
5. Monitoring and evaluation of management effectiveness to ensure that management objectives continue to be achieved over the long term.

Relocate the helipad to Coalpits Canyon. The helipad would be moved for safety reasons (as funds become available) to Coalpits Canyon, south of the towns of Rockville and Springdale. Although it is farther away, because of the limited development surrounding the area, Coalpits Canyon has been designated the safest location on park land for helicopter take-offs and landings. Because there would no longer be a helipad in the headquarters area, in extreme emergency situations, helicopters would be allowed to land in open areas of the study area.

Construct or renovate buildings to code. For safety reasons a storage building for explosives that meets code, would be provided. To adhere to EPA regulations, storage facilities for fuel and waste oil, and proper facilities for the disposal of wastewater when vehicles are washed, would be provided.

Remove hazard stones. Geologic stones in Oak Creek Canyon have been identified as hazard stones. For safety reasons, these would be removed.

Provide storage areas in all residences. In accordance with the NPS housing initiative, as homes are renovated, storage areas would be incorporated into the design.

Construct flood protection around residences in Oak Creek Canyon. Flood protection would be constructed around the residences in or near the 100-year floodplain.

Improve existing facilities to meet accessibility standards. Not all existing facilities meet accessibility standards. Therefore, each facility in the study area would be evaluated to determine if it meets accessibility standards. Those facilities not meeting the standards would be renovated to meet them.

NO-ACTION ALTERNATIVE

General Management Theme

The no-action alternative would continue existing management activities. It is the status quo alternative. Existing visitor facilities would be maintained to support current activities and programs. The area would continue to be managed as a multi-use development zone. Day and overnight visitor use, administrative, and employee functions would continue in this area. Required improvements to safety, sanitation, and access for persons with disabilities would continue to be accomplished as funding permits. Road repairs and other routine maintenance would continue.

Visitor Use/Development

Under the no-action alternative, the headquarters area would continue to be managed as a multi-use area. There are two entrance stations at the park's south boundary for collecting entrance fees, directing visitors to desired destinations, measuring oversized vehicles, and collecting fees from oversized vehicles traveling east through the tunnel. This function would continue under this alternative.

The 12,000 square-foot visitor center would continue to be the main orientation and interpretive facility. This facility includes the information desk, backcountry permitting desk, museum, auditorium, and Zion Natural History Association book sales area. There are public rest rooms directly outside of the visitor center entrance. A 70-vehicle parking lot serves the visitor center.

There is a total of 381 camping spaces in the headquarters area; 146 in the South Campground and 235 in the Watchman Campground. Both campgrounds are open to tent campers, RV campers, and groups (including commercial camping tours). Facilities include comfort stations, two amphitheaters (one in each campground) with parking lots, refuse dump stations, and fee collection/information boards. Both campgrounds are on a first-come, first-served basis. There are spaces designed to be accessible by visitors with disabilities in the South Campground. Under the no-action alternative, these facilities would remain.

Much of both campgrounds are within the probable maximum flood area, and a small number of sites in the Watchman Campground are within the 100-year floodplain. The park has a warning and evacuation plan and is in regular contact with the National Weather Service, and when severe conditions occur, park personnel evacuate campers from the campgrounds. This system would remain in place.

The 2,500 square-foot nature center (a historic structure) is near the South Campground and amphitheater, and is used for the Junior Ranger Program during the summer. The program runs Tuesday through Saturday, throughout the summer. Visitors, whether or not they are participants in the program, are welcome to view the many displays mounted in the nature center. The rest of the year, the building is used for park employee events training classes, and Elderhostel courses offered by local colleges. Although not a designated picnic area, the area around the nature center is used for picnicking, as described in the Issues section of this document. Under the no-action alternative, the nature center and grounds would continue to be used for these functions.

The Watchman trail is the only hiking trail that begins in the headquarters area. The trailhead is near the Watchman housing area and the trail follows the cliffs to an elevation of 4,400 feet. The overlook point at the top provides spectacular views up and down the canyon and into the town of Springdale.

There are three concessioners operating in the headquarters area and Zion Canyon. The Zion Natural History Association (ZNHA) has a concession permit for stamp and film sale: at their sales area in the visitor center. A concession permit is not required for sales of other items offered by the association. TW Recreation Services, Inc. (TWRS), operates the Zion Lodge, gift shop, snack bar, and interpretive tram rides. The tram operates between Zion Lodge and the Temple of Sinawava. A fee is charged to ride the tram. Bryce-Zion Trail Rides provides guided horseback rides in the canyon. Under the no-action alternative, all concessions would continue.

There are five vehicle pulloffs in the study area. One near the park entrance has a bulletin board and provides information for bicyclists. The others have been created by visitors pulling off the road to stop and look at the views. Under the no-action alternative, the five pulloffs along the main road would remain as informally designated areas.

Resource Management

The plant nursery would stay in the maintenance area and would continue not to fulfill all the needs of the resource management division's revegetation program. Visiting researchers would continue to have to share office space with park personnel. Temporary tent camping (fourteen days maximum) is allowed in Oak Creek or within the existing campgrounds. If camping is not available, researchers are responsible for finding their own housing outside the park. The open ditch irrigation system would continue.

Human Resources

Some housing is available in the headquarters area for both permanent and seasonal employees. There are three housing areas within the study area: Watchman, Pine Creek, and Oak Creek. The Watchman housing area consists of fifteen residential units, most built during the Mission 66 period (1950s), with some newer modular units. The twelve Oak Creek buildings include structures built between 1934-1937 and during the Mission 66 period. The fourteen-person dorm in Oak Creek was built in 1941 and was renovated in 1990. The three Pine Creek homes, including the park superintendent's residence, are from the CCC era (1928-1930). Including family members, approximately 95 people live in the headquarters area. There is one children's playground in each housing area, an abandoned tennis court in the Watchman housing area, and a grass volleyball court at the nature center. One housing unit in the Oak Creek district is in the 100-year floodplain, and others are precariously close.

Under the no-action alternative, no additional housing would be built and park housing would not be available for all employees. No community or day-care facilities would be provided for park employees under this alternative.

Park Operations

There are 99 full-time equivalents (FTEs) working within the headquarters area. Of those, 10 are required occupancy positions. Current annual operating and maintenance costs are \$3 million.

The administration building is attached to the visitor center. Seventy-one staff members work in the 20,000 square-foot administration building and seven work from the temporary resource management structure behind the administration building. A 40-space parking lot for park and ZNHA employees is separate from the visitor center parking lot and is located to the back of the administration building. Under the no-action alternative, additional permanent space would not be provided and crowded conditions would continue.

Employee training would continue to be held in the nature center when that facility is available, and sent out of the park when it is not.

Emergency services equipment and vehicles would remain in their present and various locations. No fitness area for rangers would be provided.

Interpretive materials would continue to be stored in residential garages away from the administration building.

The maintenance area is in the Oak Creek Historic District. There are four buildings there, which were built between 1931 and 1974. They include the auto shop, warehouse,

firehouse, and storage/shop building. There is a fire cache, a small storage shed, a three-sided shed used for temporarily storing excess park property, and a makeshift greenhouse in the area. Liquid asphalt and fuel tanks are stored in the yard, and there is a small building containing paint and flammables. Maintenance vehicles and equipment are parked in the yard, but employee vehicles are parked outside the yard. Explosives are stored in Oak Creek, outside the maintenance yard in a building that does not meet code.

Bulk construction materials, such as asphalt and gravel, are stored at the Watchman Trailhead, in Sammy's Canyon, and at the former wastewater treatment plant. Additional excess park property is stored in residential garages in the Oak Creek housing area. There is a boneyard approximately ¼-mile farther up Oak Creek, with a horse corral adjacent to it. This corral is occasionally used to house park-owned horses during the winter season.

Domestic water is supplied from within the park. The headquarters area is supplied from a network of five springs. Storage capacity totals 1.55 million gallons. Production capability is approximately 300 gallons-per-minute (gpm) combined for all systems. The average water use during the peak demand period ranges between 230 and 240 gpm. At times, water use is sustained at continuous flows that nearly meet the production capacity of the system. The park also supplies 60 gallons per minute (gpm) of culinary water to the town of Springdale in accordance with an approved memorandum of agreement (MOA).

The park sewage system is a gravity flow system. The sewage treatment lagoon system is outside the park near Rockville, Utah, and Springdale and Rockville share the system. The system is being enlarged to increase its capacity.

Electrical power in the study area is provided by Utah Power and Light Company. Telephone service is provided by U.S. West. There are some overhead telephone and power lines in the headquarters area. Buildings are heated by diesel fuel and propane, and storage tanks are next to individual buildings, either below or above the ground. Under the no-action alternative, no changes would be made to utility systems.

ALTERNATIVE ONE - Limit use to what existing funding levels and facilities can accommodate

General Management Theme

With the reality that funding for additional employees and new facilities is decreasing and the outlook for future years is not encouraging, park managers are being forced to take actions such as closing facilities and reducing services. This alternative addresses those actions park managers would need to take within the headquarters area to stay within current funding and staffing levels as they attempt to resolve issues and address various demands. This alternative is aimed at promoting protection and perpetuation of the natural and cultural resources, improving the overall visitor experience, and improving employee effectiveness and morale.

The headquarters area would remain a multi-use area, however the park would not continue to offer the level of service needed to meet ever-increasing visitation levels. Park managers would take the following management and development actions, which would affect visitor use in the study area.

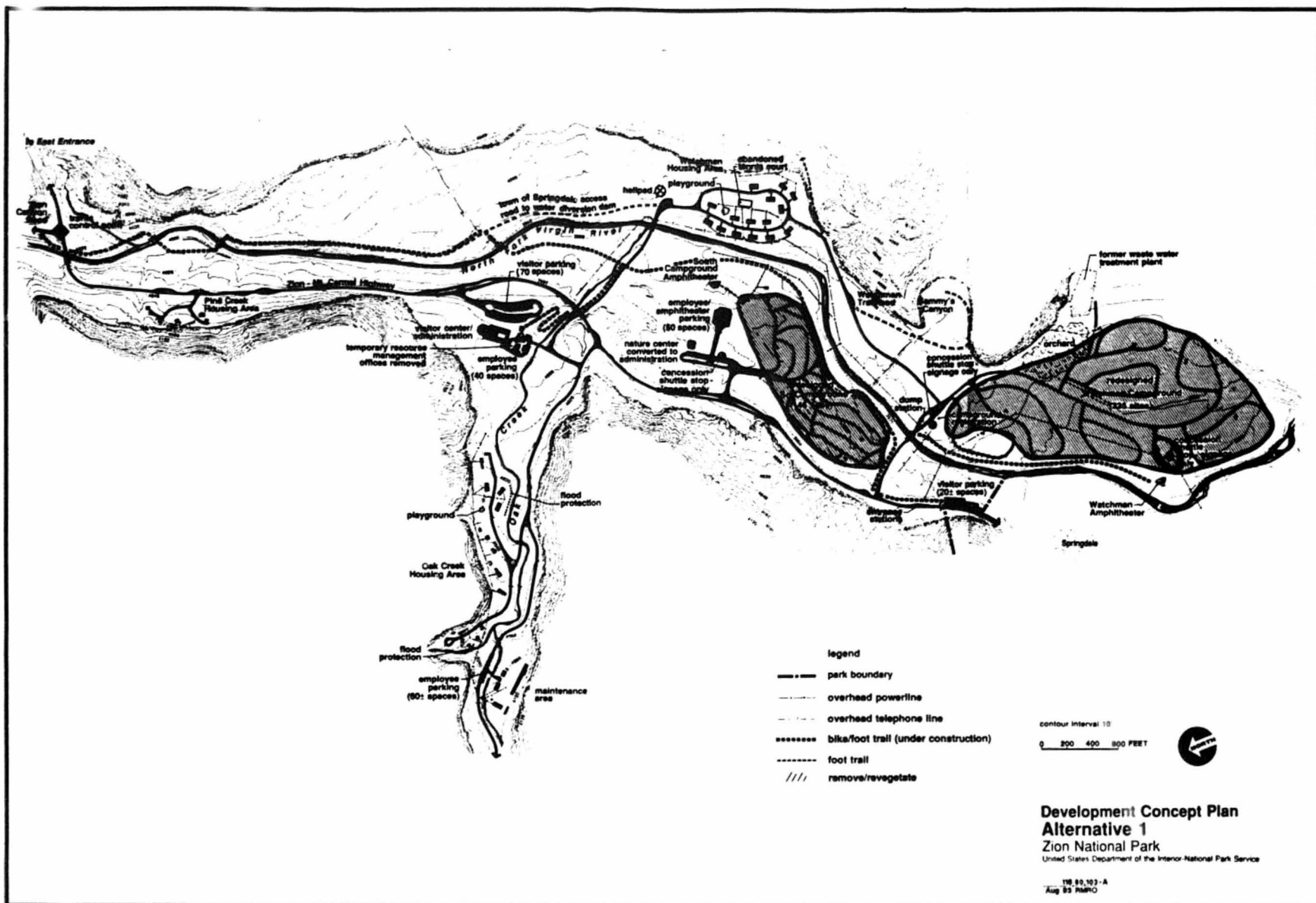
Visitor Use/Development

To decrease demand on the visitor center, park managers would reduce the hours of operation of that facility and tour bus operations would be restricted from stopping at the visitor center during peak hours. To compensate for the information the tour bus rider would not receive at the visitor center, the bus operators would be requested to provide orientation and interpretive information to the visitors on the bus. These actions would reduce the physical congestion at the visitor center, the length-of-stay of those who do stop, and the costs associated to operate the visitor center.

To reduce both the number of people looking for camping at the park, and the number turned away because the campgrounds are full, reservations for all campsites would be required. This would be advertised through a number of different media such as park brochures, signing along major highways leading into Zion National Park, radio stations that broadcast park information including camping information, concessioner's marketing information, and other travel information sources that promote Zion National Park. In addition, commercially sponsored camping groups would be eliminated to help reduce the total number of people in the campgrounds at one time.

Because of the intensive use the campgrounds receive, they would require some redesign to improve circulation, individual campsite designation, and for long-term protection of the natural and cultural resources. Should funding levels continue to decrease, however, park managers may be forced to close portions of, or eventually all of, the campgrounds.

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To further reduce the congestion in Zion Canyon, park managers would restrict the number of vehicles going up the canyon during peak hours in the peak season, by closing vehicular access at the entrance to the Zion Canyon road. This would require a park ranger to be stationed at the intersection of Zion-Mt. Carmel and Zion Canyon roads to stop and reroute traffic. It may also require a shelter and/or a physical traffic control device.

To reduce the number of vehicles driving up Zion Canyon each day, the concessioner would expand its existing shuttle system to operate in the campgrounds. This would provide an opportunity for the visitors in the campground to leave their vehicles (potentially 381 vehicles) parked in the campground while they tour the canyon rather than driving up and back down the canyon at least once during their stay in the park. Expansion of the concessioner's shuttle would require two additional buses, five additional concession personnel, and designated shuttle stops in both campgrounds. The concessioner currently charges shuttle riders and a fee for campground users would be likely.

The Junior Ranger Program would be eliminated or restructured and focused as an outdoor program, and removed from the nature center. This would be done in response to the park's greater need for office space for existing staff. Picnicking would not be a compatible use with the administrative function, and would not be allowed in this area.

To reduce the amount of indiscriminate parking along the roadside, pulloffs along the main road would be designated by placing large boulders to define their edges and by placement of an occasional sign reading "Park Only in Designated Areas."

Resource Management

Because of limited funding, the park's plant nursery would remain in the maintenance area and the park would produce as much plant material as could be produced under these conditions. Transplanting salvage plants from within the park would be encouraged as a way to obtain plant material that would not increase spending.

The visiting researcher program would continue to allow researchers to temporarily camp in Oak Creek Canyon or within the existing campgrounds, with a fourteen-day limit, as space permits.

Irrigation of the campgrounds would continue through the existing open ditch system, using river water.

Human Resources

No new housing in the park would be provided for park employees. Park managers would, however, investigate alternative approaches for providing future employee housing

outside the park. Because of the shortage of available housing in and outside the park, the housing units in or near the Oak Creek Canyon 100-year floodplain would continue to be used for housing.

No community or day-care facilities would be provided.

Park Operations

To satisfy the need for park staff administrative space, the nature center would be converted to administrative use and would be retrofitted to provide access for persons with disabilities. The amphitheater parking lot would be used for employee parking. This would not conflict with the visitor's use of the amphitheater, which is mainly for evening use after park personnel working hours. Adaptive use of the nature center for park personnel would allow the resource management staff to move out of and remove the temporary building they are now using.

Employee training would be held in the auditorium and/or the nature center depending on the specific needs of training classes.

Staffing Requirements

Implementation of this alternative would result in a decrease of 4 to 5 FTEs and would decrease annual operating and maintenance costs by \$200,000.

Future Plans and Studies Needed

Visitor Experience and Resource Protection Program (VERP)
Housing Alternatives Study

Construction Phasing and Costs

Table 1 is a conceptual phasing program for development of actions proposed in this alternative. Costs represented are class "C" estimates based on the NPS estimating guide (April 1991 through October 1994).

Table 1, DEVELOPMENT COST ESTIMATE, ALTERNATIVE ONE

Priority	Action	Quantity	Cost
1	TRAFFIC CONTROL AT ZION CANYON ROAD		
	Vehicle control station at Zion Canyon Road	1 lump sum	131,000
		Subtotal	131,000
1	SHUTTLE BUS STOPS (Watchmen and South Campgrounds)		
	Shuttle stop signage	3 ea	400
		Subtotal	400
2	REDESIGN CAMPGROUNDS (to be done in phases as funds are available)		
	Obliterate roads	5,300 sq	76,300
	New roads	0.20 mi	108,000
	Rehab campsites	381 ea	349,300
	Revegetate	1 ac	14,200
		Subtotal	547,800
2	NATURE CENTER		
	Renovate for administrative use	2,500 sq	180,100
	Upgrade utilities	1 lump sum	26,200
		Subtotal	206,300
3	VEHICLE PULLOFFS		
	Add boulders around edge of pulloffs	1 lump sum	1,300
		Subtotal	1,300
1	OAK CREEK HOUSING		
	Construct flood protection structures around housing	1 lump sum	65,500
		Subtotal	65,500
3	ADMINISTRATIVE FACILITIES		
	Remove temporary resource management building	1 lump sum	2,600
		Subtotal	2,600
1	EMERGENCY SERVICES FACILITIES		
	Relocate helipad to Coalpit Canyon	1 lump sum	65,500
		Subtotal	65,500
1	MAINTENANCE COMPLEX		
	Construct vehicle wash/water disposal facility (to EPA stds.)	800 sq	120,500
1	Replace paint storage building (to EPA stds.)	200 sq	31,400
2	Construct storage facility for explosives	100 sq	7,800
		Subtotal	151,900
TOTAL DEVELOPMENT COSTS			1,172,300
Construction Planning			113,275
TOTAL PROJECT COSTS			1,285,575

Priorities

- 1 - Immediate Implementation (1-2 years)
- 2 - Short-term (2-5 years)
- 3 - Long-term (greater than 5 years)

ALTERNATIVE TWO - Reduce/remove development in the headquarters area

General Management Theme

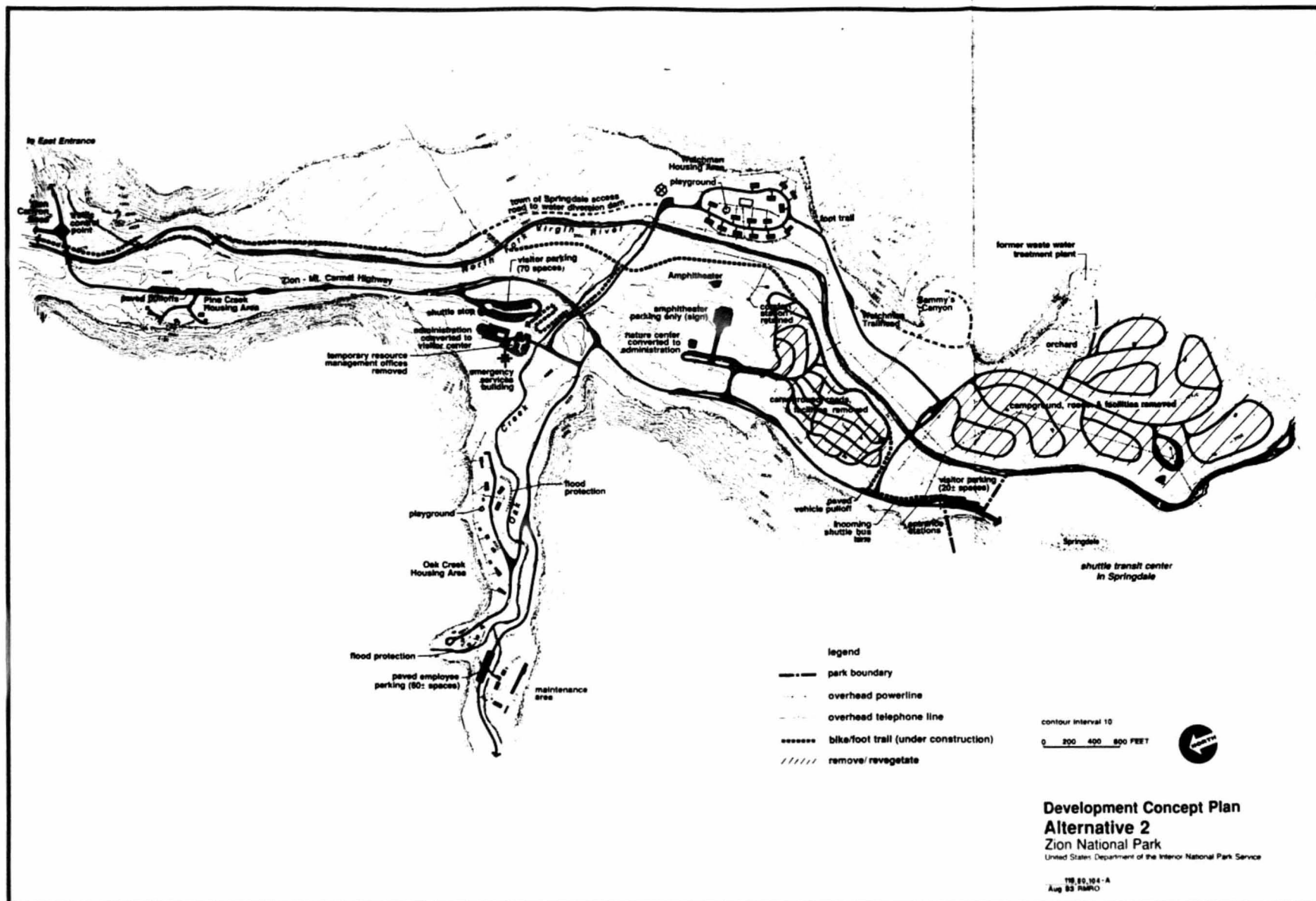
This alternative is designed to create a strong natural environment zone at the south entrance, promote protection and perpetuation of the natural resources, improve the overall visitor experience, and improve employee effectiveness and morale. This would be accomplished by reducing development in the headquarters area. Functions and facilities now within the headquarters area would be relocated outside the headquarters area in the neighboring communities or on park lands south of the park entrance. To promote alternative means of transportation, the National Park Service supports implementation of a shuttle system based outside of the park, and a bike path through the headquarters area.

Visitor Use/Development

To remove the vehicles and congestion along park roads and protect the natural resources in the park, a mandatory shuttle bus system would be implemented during the peak visitor season. The system would be based outside the park to maintain the natural character inside the park. The system would be phased into operation over a number of years, with the first phase operating between the transit center outside the park and the Temple of Sinawava, and eventually operating to the east entrance of the park. The transit center would be on an 80-acre parcel of BLM land near the edge of the town of Springdale, which is designated for recreation and public use. Congressional authorization would be needed for the NPS to provide facilities on this parcel of land.

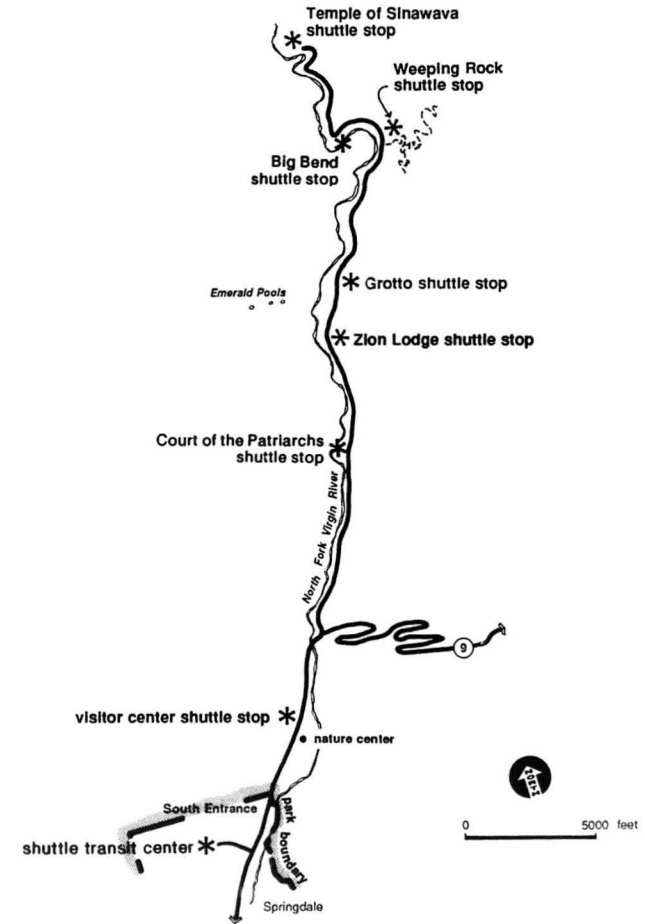
The main route is 9.2 miles one way; from the transit center to the Temple of Sinawava (see Shuttle Stops map - Alternative Two). Intermediate stops would include the visitor center, Court of the Patriarchs trailhead, Zion Lodge, the Grotto picnic area, Weeping Rock trailhead, and the Big Bend turnout.

Ridership is expected to average about 4,300 visitors per day during the summer visitor season (based on 1993 visitation projections). That number includes a 20 percent diversion rate (percentage of visitors that would not ride the shuttle for a variety of reasons). The shuttle would operate 14 hours a day (7:00 a.m. to 9:00 p.m.), March through October. Thirteen vehicles with two reserve vehicles would be used during the busiest summer season (June through September). The system could run on a limited basis earlier than 7:00 a.m. or later than 9:00 p.m., depending on visitor-use demand. Interpretive information would be provided to visitors during the ride up the canyon through a medium designed to minimize noise impacts. Lodge patrons would be allowed to drive their vehicles to the lodge, but once there, they would be required to ride the shuttle through the canyon. An additional incoming lane at the entrance station designated for the shuttle buses would be needed. Eventually, the system would service the east side of the park with another staging area near the park's east entrance.



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**Shuttle Stops
Development Concept Plan
Alternative 2**

Buses would be open-air trams. These buses provide excellent viewing opportunities and ventilation and are easily entered and exited. Passenger capacity of full-length trams can exceed 60 persons, surpassing the capacity of any enclosed bus. The vehicles would be fully accessible to visitors with disabilities and can be modified to provide storage space (for visitors' coolers, backpacks, etc.). The tram would be fueled with propane, which is preferred over gasoline/diesel, compressed natural gas, or electric power, because of its reduced emissions, lower cost, and as compared to compressed natural gas, more readily available technology.

The main staging area would include

- parking (including the required percent designed to meet Uniform Federal Accessibility Standards (UFAS) and American with Disabilities Act (ADA) standards for accessible parking)

- fee collection building and bus loading/waiting zone

- information bulletin board(s)

- visitor comfort facilities (rest rooms, benches, drinking fountains, public telephones)

- shuttle bus maintenance and storage facilities

All facilities would be designed to meet UFAS and ADA standards for accessibility.

The transportation study calculated that if the shuttle were implemented in 1993, a parking area for 500 vehicles (10 percent recreational vehicles and buses; 3.8 acres) will be needed to accommodate projected visitor use. A bus loading and waiting area of 20,000 square feet (0.5 acres) would also be needed. Due to the seasonal peaking nature of travel demand, another 15 percent for parking (75 spaces, 0.5 acres) is recommended. Therefore, 4.8 acres would be needed for parking, bus waiting, and bus loading areas to accommodate visitation in the first year of operation. The shuttle storage and maintenance building would also be here. This would require approximately 18,000 square feet (0.4 acres) of building space. Therefore, total area for parking, bus loading/waiting, and bus storage and maintenance facilities would be 5.2 acres. Considering that that figure includes overflow space, that amount of area is estimated to accommodate growth projected to 1997. However, by the year 2003, demand for parking would reach 850 vehicles (6.4 acres). Increasing the total area needed by the year 2003 to 7.8 acres.

Management strategies for the shuttle system range from the NPS owning and operating the entire system, to a concessioner owning and operating the entire system, to a combination of the two. The specifics of how the shuttle system is managed and who pays for what facilities would be negotiated upon approval of this alternative to implement

a transportation system. Under the assumption that the concessioner is financially responsible for purchasing only the vehicles (propane fueled) and for operating the system, the costs are estimated to be: total capital costs of \$1,740,000 (purchase of buses); annual capital costs of \$259,311, and annual operating and maintenance costs of \$809,483 (including 43 seasonal employees and 2 permanent for operating the buses, supplies, fuel, maintenance, and insurance); for total annual costs of \$1,068,794. This cost is based on an 8 percent interest rate amortized over 10 years. The break-even cost per expected rider is \$1.33.

If the system were a concession-run operation, an increase in the cost per rider would be required to cover the concessioner's profit. The estimated charge per rider in order to produce a profit is \$1.50. Use of another type of bus (fueled by electric or compressed natural gas) would further increase the cost to the rider. Moreover, the cost per rider would again increase should the concessioner be financially responsible for additional facilities (the shuttle maintenance facility estimated at \$1,610,000, and/or storage facilities estimated at \$1,290,000).

Implementation of a shuttle system would cause a major change in the way visitors use the park and would require changes to the park's information and interpretive program. To determine the appropriate interpretive services, an interpretive prospectus should be prepared.

To accommodate the visitor-use demand on the visitor center, some of the park headquarters administrative functions would be relocated outside the south entrance area (see Park Operations section, below) and the vacated administrative space would be adapted for visitor center functions and interpretive division personnel.

To sustain a more natural environment at the park's south entrance and to save operating monies, the campgrounds (roads, campsites, comfort stations, dump stations, etc.) would be removed. As a result, the headquarters area would become a day-use only area. Removing the campgrounds would also remove the visual and auditory conflicts associated with having the campground directly across the Virgin River from the town of Springdale.

In response to the park's need for office space, the Junior Ranger Program would be discontinued or restructured as an outdoor program, and removed from the nature center. The nature center would be renovated and used for administration personnel. Picnicking is not a compatible use with the administrative function, and would not be allowed in this area.

To reduce the impacts to the native vegetation along the road, the number of pulloffs along the main road would be reduced, and those that remained would be designed and specifically designated as vehicle pulloffs.

In the headquarters area, the visitor experience and resource protection process would monitor visitor use of the transit center and shuttle system, trails, roads, and administrative and operational facilities.

Resource Management

To perpetuate the park's revegetation program and to have a source of native plant material available, the park would contract with an outside entity. The park's research facility would be outside the headquarters area. This facility would include 2, 2-bedroom duplexes and an office/work building. Possible locations include Springdale, BLM land in Springdale, Coalpits Canyon, or Kanab.

With the removal of the South and Watchman campgrounds, a revegetation program for these areas would be implemented. Irrigation of these areas would be necessary to reestablish and maintain existing vegetation, therefore, the irrigation ditches would remain. The potable water irrigation system would be converted to use river water.

Human Resources

No new housing would be provided in the park for park employees. Park managers would, however, investigate alternative approaches for providing future employee housing outside the park or at the Coalpits Canyon area south of the town of Springdale, but within the park boundary.

Because of the shortage of available housing in and outside the park, the housing units in or near the Oak Creek Canyon 100-year floodplain would continue to be used for housing.

No community or day-care facilities would be provided to park employees.

Park Operations

To accommodate the increasing space needs of administrative functions while limiting construction of new facilities in the headquarters area, some of the park headquarters offices would be relocated outside the headquarters area. Locations to be considered for park headquarters office space include Coalpits Canyon, St. George, Kanab, and Cedar City. The nature center would also be adapted for administrative use. The temporary resource management building would be removed. Employee training would be held in the visitor center and/or the nature center. The nature center would be retrofitted and all new construction designed to meet UFAS and ADA standards for accessibility.

Although the concept of this alternative is to reduce development in the park, it is the consensus of park managers that emergency services is such an essential and important

function that an emergency services facility needs to be built within the park in order to respond quickly so visitor lives are not endangered. The potential for rock slides outside the park, which could restrict access to the park, is another reason for locating the emergency services facility within the park. Therefore, under this alternative, an emergency services facility would be located near the current administration building. This facility would include three bays for parking emergency vehicles, a fire cache, a ranger fitness room, a visitor first aid room, and the domestic animal impound area. A portion of the existing administrative building would remain as offices for emergency services personnel.

A small amount of space in the maintenance complex would be vacated when the emergency services building is constructed and would be used for maintenance functions and storage of interpretive materials. No additional space would be constructed in the maintenance area. Operations would continue under current conditions.

Staffing Requirements

Implementation of this alternative would result in a shift in functions but no change in the number of FTEs. Annual operating and maintenance costs would remain at \$3 million.

Future Plans and Studies Needed

The following plans and studies would be needed to implement this alternative.

- Housing Alternatives Plan
- Office Relocation Plan/GSA Study
- Campground Revegetation Plan
- Visitor Experience and Resource Protection Plan (VERP)
- Interpretive Prospectus
- Cultural Landscape Assessment
- Rapid Ethnographic Assessment Procedures
- Ethnographic Overview and Assessment

Construction Phasing and Costs

Table 2 is a conceptual phasing program for development of actions proposed in this alternative. Costs represented are class "C" estimates based on the NPS estimating guide (April 1991 through October 1994).

Table 2, DEVELOPMENT COST ESTIMATE, ALTERNATIVE TWO

Priority	Action	Quantity	Cost
TRANSIT CENTER (Outside Park) **			
1	Parking lot	710 cars	1,209,100
		100 RVs	628,800
		40 buses	251,500
1	Information/fee collection contact station	700 sf	105,400
1	Interpretive waysides	3 ea	29,400
1	Bus loading/waiting plaza	2,222 sy	160,000
1	Bus shelter	2 ea	18,300
1	Benches	12 ea	13,300
1	Water drinking fountain	2 ea	7,000
1	Parking lot lighting	10 ea	34,000
1	Bike rack	5 ea	3,200
1	Trash receptacle	5 ea	2,600
1	Connect water	500 lf	22,200
1	Connect sewer	500 lf	26,200
1	Connect electric	500 lf	11,700
2	Add one incoming lane at entrance station for shuttle bus only use	800 sy	52,400
2	Add mechanical vehicle control device for shuttle bus lane	1 lump sum	5,200
1	Landscaping	10%	252,300
	Subtotal		2,832,600
TRANSIT SYSTEM MAINTENANCE FACILITIES (Outside Park) **			
	Maintenance building/equipment	5,000 sf	1,687,200
	Vehicle storage building	13,000 sf	1,351,900
	Shuttle employee parking	45 cars	88,400
	Connect water	1,000 lf	44,500
	Connect sewer	1,000 lf	52,400
	Connect electric	1,000 lf	23,500
	Subtotal		3,247,900
SHUTTLE BUS STOPS (Visitor Center, Court of the Patriarchs, Zion Lodge, Grotto Picnic Area, Weeping Rock, Big Bend, Temple of Sinawava)			
	Bus shelter	7 ea	64,100
	Benches	14 ea	15,500
	Shuttle stop signage	7 ea	1,800
	Bulletin board	7 ea	5,900
	Interpretive wayside	7 ea	68,700
	Trash receptacle	7 ea	3,600
	Sidewalk at loading area	3,500 sf	28,000
	Loading zone pavement striping	1 lump sum	1,300
	Comfort stations (Lodge and Grotto)	2 ea	262,000
	Connect utilities at Lodge and Weeping Rock		
	Water	5,000 lf	222,700
	Sewer	5,000 lf	262,000
	Electric	5,000 lf	117,900
	Subtotal		1,053,500
VISITOR CENTER			
1	Add shuttle stop		
	Shelter	1 ea	9,100
	Benches	2 ea	2,200
	Bulletin board	1 ea	800
	Trash receptacle	1 ea	500
3	Renovate administrative area for visitor center use	1,520 sf	149,300
3	Enlarge rest rooms	400 sf	131,000
	Subtotal		292,900

1	CAMPGROUNDS			641,900
	Obliterate existing roads	35,000 sy		4,500
	Remove comfort stations (10)	1,000 sf		1,300
	Remove dump stations	1 lump sum		28,800
	Revegetate obliterated roads, campsites	11 ac		4,900
	Extend Watchman Trail to Watchman Campground	1,000 lf		
	Subtotal			681,400
3	VEHICLE PULLOFFS			12,200
	Obliterate gravel pulloffs and revegetate	667 sy		43,400
	Pave pulloffs	500 lf		1,300
	Add boulders around edge of pulloffs	1 lump sum		
	Subtotal			1,419,700
2	IRRIGATION SYSTEMS			108,000
	Convert potable irrigation system to river water	11 ac		
	Subtotal			108,000
3	RESOURCE RESEARCH CAMP (Outside Headquarters Area)			330,100
	Construct 2-bedroom duplexes	4 units		73,300
	Construct office/work space	800 sf		44,500
	Connect water	1,000 lf		52,400
	Connect sewer	1,000 lf		23,500
	Connect electric	1,000 lf		
	Subtotal			523,800
1	OAK CREEK HOUSING			65,500
	Construct flood protection structures around housing	1 lump sum		
	Subtotal			65,500
2	ADMINISTRATIVE FACILITIES			
	Relocate administrative office space outside headquarters area (Costs based on construction of new buildings only, 10 employees at 152 sf each = 1,520sf)	1,520 sf		278,700
	Parking lot	20 cars		44,500
	Provide utilities	1 lump sum		196,500
	Subtotal			519,700
1	EMERGENCY SERVICES FACILITIES			572,400
	Construct emergency services building at administration area	3,800 sf		18,600
1	Construct flood-control earthen dike	888 cy		65,500
1	Relocate helpaid to Coalpits Canyon	1 lump sum		
	Subtotal			656,500
1	MAINTENANCE COMPLEX			120,500
	Construct vehicle wash/water disposal facility (to EPA stds.)	800 sf		31,400
1	Replace paint storage building (to EPA stds.)	200 sf		7,800
2	Construct storage facility for explosives	100 sf		110,000
3	Pave employee parking area	60 cars		
	Subtotal			269,700
	TOTAL DEVELOPMENT COSTS			11,671,200
	Construction Planning			1,967,700
	TOTAL PROJECT COSTS			13,638,900

Priorities

- 1 - Immediate Implementation (1-2 years)
- 2 - Short-term (2-5 years)
- 3 - Long-term (greater than 5 years)

** An additional cost, that is not a construction cost, is the cost of purchasing the shuttle buses. Purchase of 15 buses is estimated at 1,740,000. Financed at 8% per year for ten years, the annual cost is 259,300. The financial responsibility for shuttle system facilities and equipment would be negotiated between the NPS and the concessioner or contractor after approval of this alternative to implement a shuttle system. Congressional authorization for the NPS to build facilities outside the park would be needed.

PROPOSAL - Accommodate visitation through implementation of a shuttle bus system

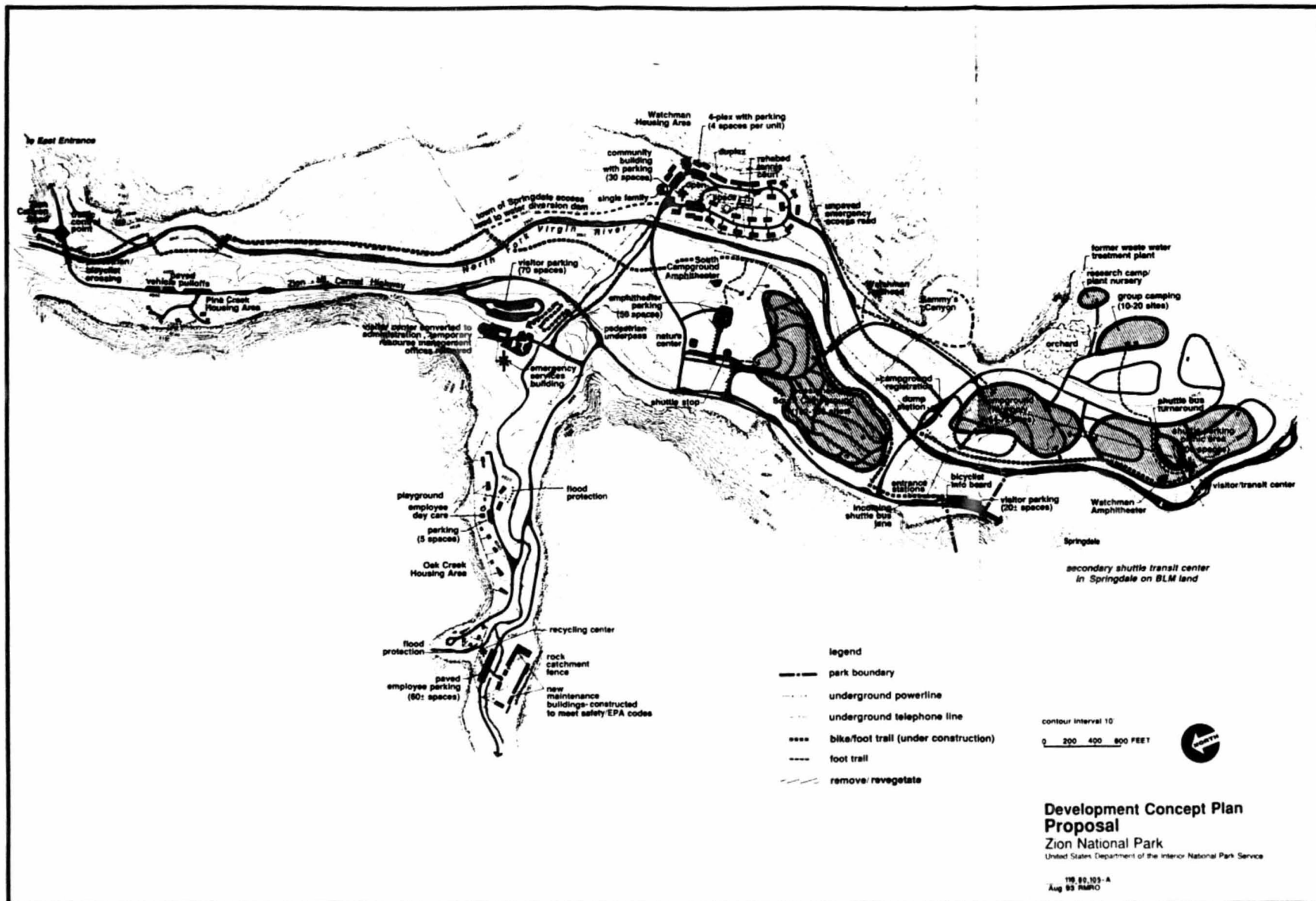
General Management Theme

The proposal is designed to reduce vehicular congestion in Zion Canyon, improve the overall visitor experience, promote protection of the natural and cultural resources, and improve employee effectiveness and morale. This would be accomplished by eliminating vehicles in Zion Canyon and promoting alternative means of transportation during the peak visitor season through the implementation of a shuttle bus system and a bike path, providing facilities for the resource management program, and providing facilities to upgrade employee living conditions.

Visitor Use/Development

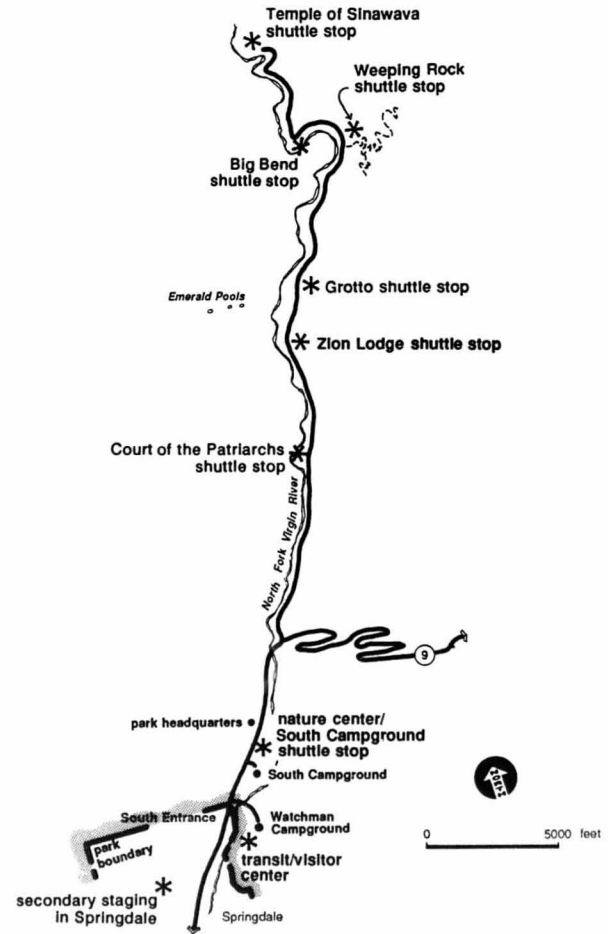
To remove the vehicles and congestion along park roads and protect the natural and cultural resources in the park, a shuttle bus system based in the park with a secondary staging area outside the park, would be implemented during the peak visitor season (March - October). The initial phase of operation would run between the transit center (in the Watchman Campground) and the Temple of Sinawava. To minimize the number of parking spaces required in the park, a second staging area would be on a parcel of BLM land that borders the town of Springdale. The system would be mandatory for all visitors wishing to go into Zion Canyon during the peak visitor season. Visitors staying at the Zion Lodge would be allowed to drive their vehicles to the Lodge, but once there, they would be required to ride the shuttle any time they toured the canyon. NPS employees and concession service vehicles would be allowed to drive the canyon road.

The route is approximately 8 miles one way; from the transit/visitor center to the Temple of Sinawava (see Shuttle Stops map - Proposal). Intermediate stops include the South Campground/Nature Center, Court of the Patriarchs trailhead, the Zion Lodge, the Grotto picnic area, Weeping Rock, and the Big Bend turnout. Ridership is expected to average 4,300 visitors per day during the summer visitor season (based on 1993 visitation projections). One-way travel time from the transit/visitor center is estimated at 44 minutes, 54 minutes to the staging area in Springdale. The shuttle would operate 14 hours a day (7:00 a.m. to 9:00 p.m.) March through October. Thirteen vehicles and two reserve vehicles would be used during the busiest summer season (June through September). The system could run on a limited basis earlier than 7:00 a.m. or later than 9:00 p.m., depending on visitor-use demand. Eventually, the system would service the east side of the park with another staging area near the park's east entrance.



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48



Shuttle Stops Development Concept Plan Proposal

Buses would be open-air trams. These buses offer excellent viewing opportunities and ventilation and are easily entered and exited. Passenger capacity of full-length trams can exceed 60 persons, surpassing the capacity of any enclosed bus. The vehicles would be fully accessible to visitors with disabilities and can be modified to provide storage space (for visitors' coolers, backpacks, etc.). The tram would be fueled with propane, which is preferred over gasoline/diesel, compressed natural gas, or electric power, because of its reduced emissions, lower cost, and as compared to compressed natural gas, more readily available technology.

Because the visitor would enter the park and be directed to a transit center rather than the existing visitor center, this area would become the main visitor contact point and all visitor center functions would be relocated to this area. Combining the transit center with the visitor center would allow the visitor to receive basic orientation, safety, and interpretive information at one point, when they initially enter the park. This would facilitate visitor trip planning so they could make the best use of their valuable time in the park. The proposed transit/visitor center would include

- a visitor information/fee collection center
- a museum
- an auditorium
- a Zion Natural History Association sales area
- visitor comfort facilities (rest rooms, public telephones, water drinking fountain)
- outdoor shuttle loading and waiting zones
- parking (including the required percentage designed to meet UFAS/ADA standards for accessible parking)
- picnic tables

All facilities would be designed to meet UFAS/ADA standards for accessibility.

The Zion Transportation Study, 1993, calculated that were the shuttle to be implemented in 1993, a parking area for 500 vehicles (10 percent recreational vehicles and buses) (3.8 acres) would be needed. A loading and waiting area estimated at 20,000 square feet (0.5 acres) would be required. Due to the seasonal peaking nature of travel, another 15 percent for parking (75 spaces, 0.5 acres) is recommended. Therefore, 4.8 acres of land would be needed for parking, bus waiting, and bus loading areas to accommodate visitation in the first year of operation. Considering that that figure includes overflow space, this area should accommodate growth projected to 1997. In addition to the

parking and bus loading and waiting area, the visitor center is projected to require 19,000 square feet (0.4-acre). By the year 2003, demand for parking would reach 850 vehicles (6.4 acres). Therefore, a total maximum of 7.8 acres would be needed by the year 2003 for the entire transit/visitor center.

To minimize the area required to park 850 vehicles in the park, the NPS promotes implementing a secondary staging area in Springdale, on an 80-acre parcel of BLM land designated for recreation and public purpose. Only a small portion of it would used to defray the size of the parking area required in the park. The shuttle storage and maintenance facility (18,000 square feet) would also be located on the BLM parcel and congressional authorization would be needed for the NPS to provide facilities on this parcel.

Management strategies for the shuttle range from the NPS owning and operating the entire system, to a concessioner owning and operating the entire system, to a combination of the two. The specifics of how the shuttle system is managed and who is financially responsible for what facilities would be negotiated upon approval to implement a transportation system. Under the assumption that a concessioner is financially responsible for purchasing only the vehicles (propane fueled) and for operating the system, the costs are estimated to be: total capital costs of \$1,740,000 (purchase of vehicles); annual capital costs of \$259,300; and annual operating and maintenance costs of \$809,500 (including 43 seasonal employees and 2 permanent for operating the buses, supplies, fuel, maintenance, and insurance); for total annual costs of \$1,068,800. This cost is based on an 8 percent interest rate amortized over 10 years. The break-even cost per expected rider is estimated at \$1.33. (The break-even cost per rider would rise to \$1.40 when the secondary staging area was implemented, because additional buses and personnel would be needed to operate the additional distance outside the park).

If the system were a concession-run operation, an increase in the cost per rider would be required to cover the concessioner's profit. The estimated charge per rider in order to produce a profit is \$1.50. The cost to the rider would increase by implementing the secondary staging, or using another type of bus (electric or compressed natural gas). In addition, the cost per rider would increase if the concessioner were financially responsible for additional facilities (the shuttle maintenance building estimated at \$1,610,000 and storage facilities estimated at \$1,290,000).

In addition to removing vehicles from the canyon, the shuttle system would also control the total number of people in the canyon at one time during the peak season. This would be done for long-term protection of the natural resources and visitor experience. It would be accomplished by scheduling how often buses drive through the canyon and by adjusting the route as needed to prevent one area from receiving more people at one time than it could handle. A visitor experience and resource protection process would monitor the effectiveness of the shuttle operation. (The NPS also recognizes that if visitation continues to rise as projected, other management actions may have to be taken

to control those numbers and that the shuttle system alone will not accommodate ever-increasing visitation levels).

The Watchman Campground would be partially displaced by the transit center and the total number of campsites in the headquarters area would be reduced. Reservations for a portion of campsites in each camping area would be required and commercial camping would continue to be allowed. The remaining camping area would be designated for "RV use only" and would accommodate (54-72 sites). These sites would be directly adjacent to the transit staging area so visitors camping could park their vehicles in a campsite, thereby reducing the amount of parking required in the staging area parking lot. Group camping sites (10-20) would be east of the transit center, on the higher plateau overlooking the Virgin River. The South Campground would be redesigned to provide 102 to 136 tent-only sites. This redesign would improve the circulation and privacy between sites, reduce density, move sites away from the main road, and reduce the impacts on the natural resources. Sites accessible for visitors with disabilities would be provided. Access to the south campground would be rerouted so there would be one major entry point to all campgrounds. All campers would access the campgrounds at the existing Watchman Campground registration station. This area would have to be expanded to accommodate the South Campground. The 100-year floodplain would be avoided in the redesign of this campground, but the campgrounds would still be within the probable maximum flood area and the evacuation system would remain in place.

Implementation of a shuttle system would be a major change in the way visitors use the park and would require changes to the park's interpretive and information programs. To determine the appropriate interpretive services, an interpretive prospectus should be prepared. In addition, the park's information system would be adjusted so potential visitors are informed well before they get to the park about the shuttle system and campground requirements. This could be done through the park brochure, signage along State Highway 9, the park's radio Transportation Information System (T.I.S.), at information areas throughout the region, in concessioner's marketing information, and through local, regional, state, and national travel companies and information services.

To reduce the disturbances to the Junior Ranger Program, picnicking would not be allowed near the nature center but would be designated near the transit/visitor center. Access points to the parking lots for the South Campground amphitheater and the nature center would be separated to eliminate conflicting uses. The nature center would be retrofitted to meet Uniform Federal Accessibility Standards and Americans with Disabilities Act standards for accessibility.

To reduce the impacts to vegetation along the main road while still allowing visitors to stop and take pictures of the spectacular scenery, pulloffs would be designed and designated.

In the headquarters area, the visitor experience and resource protection process would monitor visitor use of the transit/visitor center, campgrounds, trails, the nature center, shuttle system, roads, and administrative and operational facilities.

Resource Management

To promote the park's revegetation program and to have a stock of native species on hand in the park, a plant nursery and a research camp would be located at the former wastewater treatment plant. The plant nursery would include shade structures and an irrigation system, and the research camp facility would include 2, 2-bedroom duplexes and an office/work building.

As the campgrounds are redesigned, they would also be revegetated. To reestablish and maintain the vegetation, an irrigation system would be needed. The existing open irrigation ditches would be buried and a pressurized system using river water would be installed throughout the campgrounds. The potable water irrigation system would be converted to use river water.

Human Resources

Housing for park employees inside the park is allowed when it is determined that necessary service cannot be rendered or property of the United States cannot be adequately protected unless certain employees are required to live in government quarters on site, or an available supply - present and prospective - of governmental and private housing within a reasonable commuting distance will not meet the necessary housing requirements.

Because of the lack of housing in nearby communities, new housing would be constructed in the Watchman housing area to help alleviate the housing shortage. There is capacity for 4, 3-bedroom single-family residences, 2, 2-bedroom duplexes, and 3, 4-plex apartments. This would provide housing for park seasonal and permanent employees. Once the Watchman housing area is complete, housing for employees would have to be found outside the headquarters area and park managers would investigate alternative approaches for providing future employee housing outside the park.

Because of the shortage of housing in and outside of the park, the residences in or near the Oak Creek Canyon 100-year floodplain would remain.

Housing for the 45 shuttle operators would be the responsibility of the concessioner or contractor. To reduce the need for building more concessioner housing in the Canyon, park managers would enter into an agreement with the concessioner to build some of the housing in the Watchman housing area, which would be shared on a seasonal basis, by the concessioner and park employees.

A community facility would be located in the Watchman housing area to provide employees living in the park with community-oriented and recreational amenities typically found in residential communities. This would be a multi-purpose building to house a meeting room, fitness room, and an outdoor recreation area. A day-care facility would be provided in the Oak Creek housing area.

Park Operations

Administrative space would be expanded into the space vacated by the relocation of the visitor center to the proposed transit center. This would provide needed office space for administrative personnel and employee training programs.

To provide adequate emergency services facilities and to facilitate efficient operations, emergency services vehicles, equipment, and personnel would be consolidated. An emergency services building would be constructed near the administration building. This facility would include three bays for parking the structural and wildland fire trucks and the ambulance, a fire cache, a visitor first aid room, and a domestic animal impound area. Office space for emergency services personnel would be in the nearby administration building. Although a few miles away, the helipad would be relocated to Coalpits Canyon, south of Springdale because it is a safer location for take-offs and landings. Rangers required to participate in the NPS fitness program would use the fitness room in the community center.

A maintenance facility for the shuttle system would be required. Because of the limited space available in the park for such a facility, it is proposed that the facility be located outside the park. The preferred location would be in conjunction with the secondary transit staging area, on BLM land, in Springdale. This facility would include maintenance bays, fueling tanks, a wash facility, and a secured overnight and off-season bus storage area. To access shuttle buses in need of service, a service truck would be required. This would provide road-side maintenance and service to buses, reducing the amount of time buses would have to leave the park to go to the main maintenance area for minor service.

To provide necessary and appropriate space to carry out maintenance functions additional buildings for shop and storage space would be added to the maintenance area. The interpretive brochures and newspapers now stored in the residential garages would be relocated to the maintenance complex.

Employee parking would remain outside the maintenance area, but would be paved to clearly designate the area so vehicles would no longer impact the natural resource. Also outside the maintenance area would be a drop-off/storage area for recyclable materials.

Staffing Requirements

Implementation of this alternative would increase the park staffing level 3-5 FTEs. These additional employees would be needed to support the transportation system and campground reservation system. Annual operating and maintenance costs based on implementation of the proposal would increase by \$250,000, based on 1992 dollars.

Future Plans and Studies Needed

Visitor Experience and Resource Protection Program (VERP)
Interpretive Prospectus
Cultural Landscape Assessment
Rapid Ethnographic Assessment Procedures
Ethnographic Overview and Assessment
Campground Revegetation Plan

Construction Phasing and Costs

Table 3 is a conceptual phasing program for development of proposed actions. Costs represented are class "C" estimates based on the NPS estimating guide (April 1991 through October 1994).

Table 3, DEVELOPMENT COST ESTIMATE, PROPOSAL

Priority	Action	Quantity	Cost
TRANSIT SYSTEM STAGING AREA/VISITOR CENTER			
1	Parking lot	710 cars	1,209,100
		100 RVs	628,800
		40 buses	251,500
1	Transit/Visitor Center	19,000 sf	5,228,900
1	Visitor Center interpretive media	1 lump sum	828,500
1	Bus loading/waiting plaza	2,222 sy	160,000
1	Interpretive waysides	3 ea	29,400
1	Bus shelter	2 ea	18,300
1	Benches	12 ea	13,300
1	Water drinking fountain	2 ea	7,000
1	Picnic tables with ramadas	20 ea	120,500
1	Bike racks	5 ea	3,200
1	Trash receptacles	5 ea	2,600
1	Parking lot lighting	10 ea	34,000
1	Obillerate campground roads	4,000 sy	47,100
1	Connect water	500 lf	22,200
1	Connect sewer	500 lf	26,200
1	Connect electric	500 lf	11,700
2	Add one incoming lane at entrance station for shuttle bus only use	800 sy	52,400
2	Add mechanical vehicle control device for shuttle bus lane	1 lump sum	13,100
1	Landscaping	10%	864,100
	Subtotal		9,569,900
TRANSIT SYSTEM MAINTENANCE FACILITIES (Outside Park)**			
	Maintenance building/equipment	5,000 sf	1,687,200
	Vehicle storage building	13,000 sf	1,351,900
	Shuttle employee parking	45 cars	88,400
	Connect water	1,000 lf	44,500
	Connect sewer	1,000 lf	52,400
	Connect electric	1,000 lf	23,500
	Subtotal		3,247,900
SHUTTLE BUS STOPS (South Campground/Nature Center, Court of the Patriarchs, Zion Lodge, Grotto Picnic Area, Weeping Rock, Big Bend, Temple of Snedwards)			
	Bus shelter	7 ea	64,100
	Benches	14 ea	15,500
	Shuttle stop signage	7 ea	1,800
	Bulletin board	7 ea	5,900
	Interpretive waysides	7 ea	68,700
	Trash receptacles	7 ea	3,600
	Sidewalk at loading area	3,500 sf	28,000
	Loading zone pavement striping	1 lump sum	2,600
1	Comfort stations at Lodge and Grotto	2 ea	262,000
1	Connect utilities at Lodge & Weeping Rock		
	Water	5,000 lf	222,700
	Sewer	5,000 lf	262,000
	Electric	5,000 lf	117,900
	Subtotal		1,054,800
WATCHMAN CAMPGROUND			
	Obillerate roads	13,000 sy	238,400
	Reconstruct RV-only campsites	72 ea	754,500
	Reconstruct group campground	20 ea	209,600
	Add picnic tables	90 ea	70,700
	Add trash receptacles	50 ea	2,600
	Enlarge parking area at campground registration/info area	20 cars	44,500
	Construct trail to Transit Center	1,000 lf	4,900
	Revegetate	3 ac	8,300
	Extend Watchman Trail to Watchman and South Campgrounds	1,500 lf	7,400
	Subtotal		1,340,900

SOUTH CAMPGROUND			
1	Reroute entrance road to South Campground	1,400 lf	243,100
	Install 2-lane bridge (1)	2,400 sf	408,700
	Obillerate existing roads	9,000 sy	165,000
	Install campsites	136 ea	979,800
	Add picnic tables	100 ea	78,600
	Add trash receptacles	50 ea	26,200
	Relocate dump station to Watchman Campground	1 ea	65,500
	Revegetate	5 ac	13,100
	Subtotal		1,980,000
ACCESS ROAD TO WATCHMAN HOUSING			
2	Relocate road to housing area	1,200 lf	208,400
	Relocate road to South Campground Amphitheater parking lot	350 lf	60,700
	Convert road from Watchman Housing to Watchman Campground to gravel emergency access road	800 lf	1,600
	Subtotal		270,700
VEHICLE PULLOFFS			
3	Obillerate gravel pulloffs and revegetate	7,200 sf	14,600
	Pave pulloffs	4,800 sf	34,700
	Add boulders around edge of pulloffs	1 lump sum	1,300
	Subtotal		50,600
IRRIGATION SYSTEMS			
1	Install pressurized irrigation system in campgrounds/transit center	90 ac	884,200
2	Convert potable irrigation system to river water	11 ac	108,000
	Subtotal		992,200
OVERHEAD UTILITIES			
3	Bury overhead telephone lines	3,300 lf	77,800
	Bury overhead power lines	10,800 lf	254,600
	Subtotal		332,400
PLANT NURSERY			
3	Relocate plant nursery to former water treatment plant site	1 lump sum	40,000
	Subtotal		40,000
RESOURCE RESEARCH CAMP			
3	Construct 2, 2- bedroom duplexes	4 units	330,100
	Construct office/work space	800 sf	73,300
	Connect water	1,000 lf	44,500
	Connect sewer	1,000 lf	52,400
	Connect electric	1,000 lf	23,500
	Subtotal		523,800
WATCHMAN HOUSING			
1	Construct 4, 3-bedroom single family units	4 ea	686,400
1	Construct 2, 2- bedroom duplexes	4 units	330,100
1	Construct 3, 4-plex apartment buildings	12 units	754,500
1	Off-street parking for apartments	48 cars	94,300
2	Construct community center	2,600 sf	476,800
2	Construct parking for community center	30 cars	58,900
2	Rehab tennis court	1 lump sum	131,000
2	Landscape open recreation space at community center	10%	253,200
	Subtotal		2,785,200

ALTERNATIVES ELIMINATED FROM DETAILED CONSIDERATION

Accommodate Demand Without A Transportation System, By Enlarging and Building Additional Facilities

This alternative is aimed at enlarging or building new facilities as needed, to accommodate the increasing visitation. The visitor center and parking lot, and the South Campground would be enlarged, a bike path would be added, roads would be widened and improved to all for additional traffic demands, and park staff and support facilities (maintenance, visitor protection) would be expanded to meet visitor needs. All visitors would be allowed to enter the park and drive to all areas as they now do.

This alternative was rejected because it does not foster the park objectives of limiting vehicles in the park, protecting the natural beauty, or balancing preservation and use. With no control on the number of vehicles or people going up the canyon, eventually, the enlarged facilities would be crowded and congested as they are now, and the problems would continue.

Variations to the Proposal

A number of alternative locations for the shuttle staging area other than in the Watchman Campground were suggested. These suggestions and reasons they were not considered are listed below.

Locate Transit Center at the Existing Visitor Center. The transit center would be located at the existing visitor center and all visitors would be required to park their vehicles at this location if they intended to enter Zion Canyon. A parking area for a future capacity of 850 vehicles would be required. This parking area would service visitors and park employees. To limit the amount of surface area required for the larger number of vehicles needing parking, a parking structure would be built. Both the administrative and visitor center areas would be enlarged to provide needed space.

This location was rejected because it concentrates all visitors and administrative personnel and increases the number of people, in an already congested and limited area. Although a parking structure would limit the amount of surface area disturbed, the cost of a parking structure is many times more than surface parking and would be extraordinary to provide for 850 vehicles. A parking structure would also be out of character in this particular setting. Views of the spectacular canyon walls, in almost 360 degrees, would be obstructed by the additional development. In addition, the open area to the north/northwest of the visitor center is a wildlife corridor, which would be impacted by additional structures.

Locate Transit Center at the Nature Center. The area around the nature center would require parking for a future capacity of 850 vehicles. This could be visually screened from

OAK CREEK HOUSING			
1	Construct day care facility	2,500 sf	458,
1	Construct flood protection structures around housing	1 lump sum	65,
		Subtotal	524,
ADMINISTRATIVE FACILITIES			
2	Renovate existing visitor center for administrative use	6,300 sf	453,
	Remove temporary resource mgmt building from parking lot	1 lump sum	2,
		Subtotal	456,
EMERGENCY SERVICES FACILITIES			
1	Construct emergency services building at administration area	3,800 sf	572,
	Relocate helpup to Coalpits Canyon	1 lump sum	65,
	Construct flood-protection earthen dike	888 cy	17,
		Subtotal	8,
MAINTENANCE COMPLEX			
1	Construct vehicle wash/water disposal facility (to EPA stds.)	800 sf	120,
1	Replace paint storage building (to EPA stds.)	200 sf	31,
2	Enlarge auto shop	2,000 sf	301,
2	Enlarge shops	2,250 sf	338,
2	Construct storage facilities	1,350 sf	195,
2	Enlarge office, break, rest rooms	1,830 sf	353,
2	Pave employee parking area	60 cars	110,
2	Construct recyclable materials drop-off/storage area	1,000 sf	31,
3	Construct vehicle garage (25 stalls)	9,000 sf	707,
3	Construct rock catchment fence	1 lump sum	39,
		Subtotal	1,960,
TOTAL CONSTRUCTION COSTS			25,213,
Construction Planning			4,556,
TOTAL PROJECT COSTS			29,770,

Priorities

- 1 - Immediate Implementation (1-2 years)
- 2 - Short-term (2-5 years)
- 3 - Long-term (greater than 5 years)

** An additional cost that is not a construction cost, is the cost of purchasing the shuttle buses. Purchase of 15 buses is estimated at \$1,740,000. Financed at 8% per year for ten years, the annual cost is 259,300. The financial responsibility for shuttle system facilities and equipment would be negotiated between the NPS and the concessioner or contractor after the Transportation System Economic Feasibility Study is prepared. Congressional authorization to build facilities outside park would be needed.

the main road by existing vegetation and topographic features. The nature center itself would be converted to administrative use, and new facilities would be built in the area for visitor information, waiting, bus loading and unloading, public rest rooms, and picnicking.

This alternative was rejected because it is believed that the anticipated changes around the site would be great enough that the nature center would no longer be eligible for the National Register of Historic Places.

Locate Transit Center Near Sammy's Canyon. An area of land between the Watchman Campground and the Watchman housing area is open, flat, and large enough to accommodate parking the number of vehicles required, should a shuttle system be implemented. Access would be easy and direct from the park entrance. No facilities exist in this area, therefore everything required would need to be built.

This alternative was rejected because of the extent of disturbance that would occur to this relatively undisturbed area. There are few undisturbed areas near headquarters, and this is one of them. Additionally, the visual impact of construction here would be extensive because of the openness of the area.

Locate the Transit Center (Without Visitor Center) in the Watchman Campground. The transit center would be located in the Watchman Campground, as in the proposal, to serve as the main shuttle bus staging area. Visitors would park here, and get on the shuttle. A small information area, bus waiting area, and basic visitor comfort facilities (rest rooms, telephones, drinking fountain) would be provided. The visitor center would remain in its current location.

This alternative was rejected because it has the potential to create confusion among shuttle riders as to where to get certain information. It would also require the visitor to make two stops in order to receive orientation and interpretive information. It is believed that visitors would be best served if they receive basic orientation, safety, and interpretive information at one point when they initially enter the park, rather than searching around the park in different locations. This way the visitor can do their trip planning early in their trip and make the best use of their time in the park.

Additional Ways to Limit Visitation to Capacity of Current Facilities/Resources. Alternative one proposed actions within the headquarters area that would limit visitation, thereby reducing over-crowding, use, and impacts on the natural and cultural resources and visitor facilities. Additional options were suggested that included closing the park gate when a certain number of visitors had entered the park, requiring reservations to enter the park, or implementing a ticket system that specified a time the visitor could enter the canyon, in order to space out use.

These actions were rejected because they affect the entire park and are more appropriately addressed in a general management plan. Preparation of a general

management plan for Zion National Park is one of the Rocky Mountain Region's top planning priorities and funds have been requested. At the time a general management plan is undertaken, park-wide issues will be addressed. In addition, although seasonal closures or reservations may be required in the future, there are other actions that can be taken at this time to accommodate visitation that are not as impacting to the visitor or surrounding communities.

Table 4 - SUMMARY COMPARISON OF ALTERNATIVES

ISSUE	NO-ACTION ALTERNATIVE - Status Quo	ALTERNATIVE ONE - Limit Use/ Services	ALTERNATIVE TWO - Reduce Development	PROPOSAL - Accommodate Use, Implement Shuttle System
VISITOR USE Canyon Congestion	<p>Vehicles are allowed on the Zion Canyon road year-round. Zion canyon is congested.</p> <p>Concessioner runs shuttle system from Zion Lodge to Temple of Sinawava.</p> <p>Develop and implement a visitor experience and resource protection program (VERP).</p> <p>Bike trail "under construction."</p>	<p>Restrict numbers of vehicles in Zion Canyon during peak season by closing road at certain times of the day.</p> <p>Concessioner would expand voluntary shuttle service to campgrounds.</p> <p>Same as no-action.</p> <p>Same as no-action.</p>	<p>Mandatory shuttle system during peak season, based outside the park on BLM land. Would run from Springdale through the headquarters area to Temple of Sinawava.</p> <p>Concessioner's shuttle discontinued.</p> <p>Same as no-action.</p> <p>Same as no-action.</p>	<p>Mandatory shuttle system during peak season, based in Watchman Campground. Would run from Watchman Campground to Temple of Sinawava.</p> <p>Same as alternative two.</p> <p>Same as no-action.</p> <p>Same as no-action.</p>
Visitor Center	<p>Visitor center remains open and crowded from 8 a.m. to 8 p.m. during peak season.</p> <p>Tour buses add to visitor center congestion.</p>	<p>Reduce demand on the visitor center, shorten hours of operation.</p> <p>Restrict tour bus use of visitor center, encourage bus operators to provide information to visitors.</p>	<p>Do not reduce hours of visitor center. Expand visitor center by moving some administrative functions out of headquarters building.</p> <p>No restrictions on tour buses.</p> <p>Add shuttle stop at visitor center.</p>	<p>Build new visitor center at transit staging area. Develop and implement visitor-use management plan.</p> <p>No restrictions on tour buses.</p>
Campgrounds	<p>Campgrounds remain, providing 381 spaces on a first-come/first-served basis. Both campgrounds open to tent campers, RVs, and groups.</p>	<p>Reduce the number of people on-site looking for campsites by requiring campground reservations.</p> <p>Eliminate commercially sponsored camping.</p> <p>Close campgrounds when funding becomes too limited.</p>	<p>Campgrounds would be removed and area revegetated.</p>	<p>Total number of campsites reduced because of transit/visitor center location in Watchman Campground. Reservations required for a portion of all campsites.</p> <p>Commercial camping allowed.</p> <p>Tent, RV, and group camping sites separated.</p>

ISSUE	NO-ACTION ALTERNATIVE - Status Quo	ALTERNATIVE ONE - Limit Use/ Services	ALTERNATIVE TWO - Reduce Development	PROPOSAL - Accommodate Use, Implement Shuttle System
Nature Center/ Junior Ranger Program	<p>The nature center would continue to be used for Junior Ranger Program during the summer, and for employee events/training the rest of the year.</p> <p>Informal picnicking would continue conflicting with the Junior Ranger Program.</p>	<p>Junior Ranger Program eliminated or restructured and oriented as an outdoor program and removed from nature center.</p> <p>Renovate nature center for administrative/employee use.</p> <p>Picnicking not allowed in this area.</p>	<p>Eliminate or restructure Junior Ranger Program as an outdoor program and remove from nature center.</p> <p>Same as alternative one.</p> <p>Same as alternative one.</p>	<p>Continue Junior Ranger Program in nature center.</p> <p>No picnicking allowed at nature center. Designate picnicking at transit/visitor center.</p>
Vehicle Pulloffs	Five undesignated pulloffs would remain along main road.	Pulloff areas would be formally designated.	Reduce number of pulloffs and formally designate remaining pulloffs.	Existing pulloffs formally designated.
Accessibility	Not all facilities are fully accessible to visitors/employees with disabilities. A survey of all facilities is needed and as funds become available, changes would be made to meet accessibility standards.	Same as no-action.	Same as no-action.	Same as no-action alternative. plus camping sites would be made accessible.
RESOURCE MANAGEMENT Plant Nursery	Inadequate, makeshift plant nursery and resource management workshop remains in maintenance area.	Same as no-action.	Contract for plant material.	Plant nursery located at former water treatment plant.
Research Facility	Visiting researchers continue to share work space with park personnel, and camp when spaces available.	Same as no-action.	Research facility outside headquarters area and would include 2, 2-bedroom duplexes and an office/work building.	Research facility at former wastewater treatment plant and would include 2, 2 bedroom duplexes and an office/work building.
Irrigation	Continue open ditch system in campgrounds, potable water system in other areas.	Same as no-action.	Continue use of open ditches in campgrounds. Convert potable system to river water.	Bury open ditches, install pressurized system in campgrounds. Install irrigation system using river water for other areas.

ISSUE	NO-ACTION ALTERNATIVE - Status Quo	ALTERNATIVE ONE - Limit Use/ Services	ALTERNATIVE TWO - Reduce Development	PROPOSAL - Accommodate Use, Implement Shuttle System
HUMAN RESOURCES Employee Housing	No new employee housing, therefore, not enough housing available to all employees desiring to live in the park.	No new housing constructed. Readjust housing allotments giving priority to required occupancy positions.	Same as alternative one.	Construct additional housing units in Watchman housing area. Housing beyond what this existing area can accommodate will not be provided for in the headquarters area.
Community Facilities	No community facilities provided for employees living in the park. Nature center would continue to be used for employee gatherings.	No community facilities provided for employees living in the park.	Same as no-action.	Provide community facility to include meeting room, fitness room, outdoor recreation area in Watchman housing area.
Day Care	No day-care facilities available to park employees.	Same as no-action.	Same as no-action.	Provide day-care facility in Oak Creek housing area.
Personal Storage	Storage added to housing units in accordance with NPS housing initiative.	Same as no-action.	Same as no-action.	Same as no action.
PARK OPERATIONS Work and Office Space	Shortage of administrative space would continue. Temporary building for resource management personnel would remain in parking lot.	Adapt nature center for administrative use. Remove temporary building from administration parking lot.	Relocate functions out of the administrative building and headquarters area. Possible locations include Coalpits, St George, or Cedar City. Adapt nature center for administrative use.	Expand administration functions into current visitor center space to accommodate necessary staffing levels.
Employee Training	Training would continue in nature center or employees sent out of the park for training.	Training would be done in the auditorium or nature center.	Training would be held in renovated visitor center/nature center.	Training room provided in administration building.
Emergency Services	Emergency services offices, storage, and equipment would remain scattered throughout headquarters area. No fitness facility available for rangers.	Same as no action.	Construct emergency services building to consolidate vehicles and equipment adjacent to administration building.	Same as alternative two.
Helipad Location	As funding becomes available, helipad moved to Coalpits Canyon for safety reasons.	Same as no action.	Same as no-action.	Same as no action.
Interpretive Materials Storage	Would continue to be in residential garages.	Same as no action.	Remove from residential garages. Move to maintenance area.	Remove from residential garages. Store in maintenance or administration building.

ISSUE	NO-ACTION ALTERNATIVE - Status Quo	ALTERNATIVE ONE - Limit Use/ Services	ALTERNATIVE TWO - Reduce Development	PROPOSAL - Accommodate Use, Implement Shuttle System
Maintenance Facilities	Shortage and inadequacy of maintenance facilities would continue.	Same as no-action.	Relocate fire truck to emergency services building. use vacated space for storage. No new buildings provided.	Construct new storage and shop facilities to provide adequate amount and type of space, and to comply with EPA standards.
Utility Systems	Water system capable of providing adequate flows. Sewage system being enlarged. No change in electric, telephone, or heating systems.	Same as no-action.	Same as no-action.	Bury all utilities.

Table 5 - SUMMARY OF ENVIRONMENTAL CONSEQUENCES

RESOURCE	NO-ACTION ALTERNATIVE	ALTERNATIVE ONE	ALTERNATIVE TWO	PROPOSAL
Vegetation	Riparian and pinyon-juniper plant communities would continue to be trampled throughout campgrounds, around parking areas, vehicle pulloffs, visitor facilities, and along trails.	Fewer people at one time in Zion Canyon would reduce some indiscriminate trampling of vegetation in the riparian and pinyon-juniper communities near parking, visitor facilities, and along trails. Redesign of campgrounds to improve circulation, reduce spur roads, designate campsites, is expected to result in revegetation of 1 acre.	Removal of campsites and implementation of shuttle system would reduce number of vehicles in canyon and control number of visitors at popular areas, decreasing overall impacts to riparian and pinyon-juniper communities throughout park. Construction of facilities and revegetation of the campgrounds would result in a net loss of 1.1 acres of riparian and pinyon-juniper vegetation (0.3 percent of the total study area)	Implementation of shuttle system would drastically reduce number of vehicles in canyon and would control number of visitors at popular sites, decreasing overall impacts to riparian and pinyon-juniper communities. Reduction in the number of campsites and redesign of camping areas would reduce social trails and trampling of vegetation. Construction of facilities and revegetation would result in net loss of 10 acres of riparian and pinyon-juniper vegetation (3 percent of the total study area).
	Bike trail would be constructed mostly on existing roads or trails. (Refer to the DSC DCP/EA for more detail.)	Same as no-action.	Same as no-action	Same as no-action
	Irrigation system would continue to provide inadequate water to Cottonwood, box elder, and velvet ash in campgrounds, stifling their rejuvenation, while encouraging growth of exotics.	Impact to cottonwood, box elder and velvet ash same as in no action alternative	Revegetation would be facilitated by the ditch irrigation system	Pressurized irrigation system would support existence and rejuvenation of the cottonwood, box elder, and velvet ash riparian vegetation.

RESOURCE	NO-ACTION ALTERNATIVE	ALTERNATIVE ONE	ALTERNATIVE TWO	PROPOSAL
Soils	Soils would continue to be compacted, which decreases permeability, locally alters soil moisture, and diminishes water storage capability, resulting in slower rates of water transmission within soils, increased runoff, and increased erosion. Prolonged trampling would decrease vegetation and increase exposure of ground to erosive rainfall.	<p>Compaction and erosion due to visitor trampling would be decreased slightly because of the reduction in number of people in Zion Canyon and at the visitor center.</p> <p>Redesign of campgrounds to improve circulation, reduce spur roads, designate campsites, is expected to result in revegetation of 1 acre.</p>	<p>Closure of campgrounds would result in elimination of visitor impacts on soils, facilitating revegetation. The shuttle system would control number of people at one time on trails, at parking areas, and visitor facilities, reducing localized compaction and erosion.</p> <p>Construction of facilities and revegetation of the campgrounds would impact of 4.1 acres of soil (1.2 percent of the total study area).</p> <p>Sites disturbed by construction would undergo temporary accelerated erosion. Construction impacts would be mitigated by designing structures to collect and divert precipitation to natural drainages, retaining and replacing topsoil where possible, and constructing on slopes of less than 15 percent. Paved trails would be provided.</p>	<p>Implementation of shuttle system would result in overall reduction of soil compaction and erosion.</p> <p>Construction of facilities and revegetation would result in net loss of 10 acres of riparian and pinyon-juniper vegetation (3 percent of the total study area).</p> <p>Construction in Naplene soil type may require special construction methods because of frost in the area. Mitigation of construction impacts similar to those described for alternative two.</p>
Geology	Geologic hazard stones would be removed.	Same as no action.	<p>Same as no action.</p> <p>Construction of the emergency services building may require a dike be built to protect the structure from flooding.</p>	<p>Same as no action.</p> <p>Same as no action.</p> <p>Construction in maintenance areas would result in cutting and removing approximately 1,500 cubic yards of soil and rock. A rock catchment and barrier fence would be built to protect the area from rockfalls.</p>

RESOURCE	NO-ACTION ALTERNATIVE	ALTERNATIVE ONE	ALTERNATIVE TWO	PROPOSAL
Threatened and Endangered Species	Species listed as threatened, endangered, and candidate, occur in the study area in places where visitors have access. No documentation occurs that visitors are impacting these species, and further study is needed to determine impacts of visitor use. Current mitigation to confine use and protect areas would continue.	This alternative is not likely to adversely affect species in the study area, and reducing the concentration of visitors in the canyon, should be a benefit to those species. Current mitigation techniques would continue.	Removal of the campgrounds would remove approximately 1,000 people from the area, which should have a positive effect on any species in the area. Current mitigation techniques would continue.	This alternative is not likely to adversely affect species found in the study area. Implementation of a shuttle system would control and reduce the number of people in the canyon at one time, which should have a positive effect on those species. Current mitigation techniques would continue.
Wildlife	A number of wildlife species can be found throughout the study area. Visitor/wildlife conflicts occur on roads and trails, in the river, and around highly used visitor facilities. Current mitigation methods such as building boardwalks and fences would continue.	This alternative would slightly reduce the number of people at one time around high visitor use areas and noise levels. It is not likely to adversely effect wildlife and may have positive effects on wildlife.	Removal of the campgrounds would reduce the concentration of visitors and vehicles in the area, the noise levels, the number of people recreating in the river, and the potential for visitor/wildlife conflicts. The campgrounds would be revegetated which would increase habitat, which is expected to increase all wildlife populations found in the area. An increase in the deer population, however, may not be beneficial to that species and would require monitoring.	Implementation of a shuttle system would reduce the concentration of visitors and vehicles and noise levels on the roads, in the canyon, on trails, and at major visitor-use areas during the peak visitor use season. Proposed development would occur within already developed areas and would not be impacting undisturbed areas or significantly reducing open space. Relocating the visitor center to the transit center area would remove visitors from an area frequently used by mule deer. Implementation of the proposal is not likely to adversely impact wildlife and may result in an overall benefit to all wildlife populations.

RESOURCE	NO-ACTION ALTERNATIVE	ALTERNATIVE ONE	ALTERNATIVE TWO	PROPOSAL
Water Resources/ Floodplains/Wetlands	Sites within campground will remain in 100-year floodplain and approximately half of both campgrounds are in probable maximum flood zone. Thirty persons at one time (PAOT) are estimated to be in the 100-year floodplain and 337 in the probable maximum flood area. Construction of dikes would protect residences in or near the 100-year floodplain. The warning and evacuation plan would remain in effect.	Campsites in the 100-year floodplain would be removed, reducing the PAOT in the 100-year floodplain to 2 (the Oak Creek residents). The warning and evacuation plan would remain in effect.	Removal of campgrounds from floodplains would remove visitors from that area and reduce the potential for injury from flooding. Two PAOT are expected to be within the 100-year floodplain and 147 in the probable maximum flood area.	Construction of the transit/visitor center in Watchman Campground would be within probable maximum flood area, but would not alter floodplain characteristics. Campsites would be removed from 100-year floodplain, but camping would remain in probable maximum flood area. Two PAOT are estimated to be within the 100-year floodplain and 626 within the probable maximum flood area. The warning and evacuation plan would remain in effect, and the structural integrity of the earthen levee would be monitored regularly.
	Construction of bike trail, footbridges and accesses to the river may impact wetland vegetation, but the trail and defined accesses are expected to reduce overall indiscriminate access and impact to wetland vegetation. (Refer to the DSC DCP/EA for more detail.)	Same as no-action.	Same as no-action.	Same as no-action.
	Visitor use of Virgin River may be affecting wetland vegetation and the water quality.	This alternative is not anticipated to adversely affect the natural or beneficial floodplain or wetland values.	Removal of the campgrounds would reduce the potential for impacts on wetland vegetation within the river channel and total water consumption. Dikes would be built to protect residences and emergency services building from flood damage. Implementation of this alternative is not anticipated to adversely affect the natural or beneficial floodplain or wetland values.	Construction of the transit/visitor center parking area could encompass 7.8 acres and may affect groundwater recharge. However, the impact of this is expected to be minimal and mitigation could include using permeable building materials or temporarily retaining the water on site.

RESOURCE	NO-ACTION ALTERNATIVE	ALTERNATIVE ONE	ALTERNATIVE TWO	PROPOSAL
Wilderness	The headquarters development management zone is surrounded by a natural management zone that includes a wilderness subzone. This wilderness zone represents the resources that have been recommended for wilderness and are managed as such. Wilderness values include intangible values such as solitude and quiet.	Reducing the visitor center hours and restricting use in the canyon may disperse visitors to other, less crowded areas of the park or into the wilderness, increasing noise levels in these areas.	Removing the campgrounds and implementing a shuttle system would reduce the number of people in the study area, which would reduce noise levels, and possibly increase the "quiet" value of the surrounding wilderness.	Implementation of a shuttle system would reduce the number of people in the canyon at one time and noise levels, which may be of benefit to wilderness values of quiet and solitude. The concentration of visitors at the transit/visitor center could have a small impact on the wilderness area close to the transit/visitor center.
Air Quality	Air standards not being exceeded under existing conditions. However, if visitation continues to rise, air quality could be affected by increased vehicle emissions and campfires.	Restriction of vehicles and expansion of shuttle system should reduce vehicle emissions in the canyon.	<p>Shuttle system would reduce vehicle emissions in park. Congregation of vehicles at shuttle staging area outside park could slightly increase emissions there, but is not anticipated to be enough to negatively impact air quality. Removal of the campgrounds would reduce vehicle emissions and campfire smoke, which could be impairing visibility.</p> <p>Construction of staging area and shuttle stops would temporarily increase amount of particulate matter in air, but dust would be controlled by palliatives.</p>	<p>Same as alternative two, except campgrounds remain.</p> <p>Same as alternative two.</p>

RESOURCE	NO-ACTION ALTERNATIVE	ALTERNATIVE ONE	ALTERNATIVE TWO	PROPOSAL
Visual Resources	Quality of the visual resource around high visitor-use areas would continue to decrease as visitation increases, causing crowding and physical impacts on the natural and cultural resources.	Restricting the number of vehicles in the canyon at one time would improve visual quality in the canyon and around visitor-use areas. Reduced visitor use would aid in rejuvenation of vegetation and overall quality of the scene.	<p>The shuttle system based outside park would reduce number of vehicles in the park and improve the visual quality along roads and parking areas. However, parking for shuttle system would require 7.8 acres, and would require careful site planning and architectural design.</p> <p>Removal and revegetation of campgrounds would improve the natural scene at South Entrance.</p> <p>The emergency services building would be designed to blend with existing building and be screened from view of main road.</p>	<p>The shuttle system would drastically reduce number the of vehicles and visitors on roads, parking areas, along trails, and at visitor-use areas, resulting in overall improvement of scenic quality. However, the transit/visitor center and related parking and facilities would require 7.8 acres, and would require careful site planning and architectural design.</p> <p>Redesign of campgrounds and burial of utility lines would enhance views to and within area. New residences proposed in Watchman housing area would have a temporary effect on views from the top of Watchman Trail until vegetation matured to screen them.</p> <p>Same as alternative two.</p>
Noise Quality	Buses would continue to be a major source of noise. They can be heard from high points in canyon and drown out the sound of the river.	Restrictions on the number of vehicles in the canyon during the peak visitor season would only reduce noise levels slightly.	<p>Implementation of shuttle system and prohibiting buses in the canyon would drastically reduce noise levels in canyon. However, still allowing some vehicles in the canyon would restore the natural canyon acoustic characteristics. There may be localized increases in noise levels at transit center because of concentration of vehicles in one area.</p> <p>Closure of the campgrounds would permanently remove RV/camper noise.</p>	<p>Same as alternative two.</p> <p>Providing separate campgrounds for tents only and RVs would reduce noise impacts on the tent campers.</p>

RESOURCE	NO-ACTION ALTERNATIVE	ALTERNATIVE ONE	ALTERNATIVE TWO	PROPOSAL
Archeological Resources	As visitor use increases, potential impacts to sites would increase.	Closure of Zion Canyon road during peak times would control numbers of visitors and could reduce potential impacts to sites in canyon. There are no actions proposed in this alternative that would impact archeological sites in the headquarters area.	<p>Closure of campgrounds would remove potential impacts to archeological sites in those areas.</p> <p>Shuttle system would control number of visitors in canyon and could reduce potential for impacts to sites in canyon.</p> <p>Prior to construction all sites (including the BLM site) would be evaluated for eligibility for National Register.</p>	<p>Removing camping from immediate area of archeo site in Watchman Campground would reduce potential impact to that site.</p> <p>Shuttle system would have similar effects to those mentioned in alternative two.</p> <p>Effect of realigning the road to Watchman housing area on the archeo site in that area is not known. Site would be evaluated for National Register eligibility, and if determined eligible and NPS is unable to avoid it, data recovery would occur.</p> <p>Converting the existing road to Watchman housing to a trail could result in surface collection of site nearby. They should be evaluated for eligibility and collected and placed in park collection.</p> <p>Prior to construction all sites (including the BLM site) would be evaluated for eligibility for National Register.</p>

RESOURCE	NO-ACTION ALTERNATIVE	ALTERNATIVE ONE	ALTERNATIVE TWO	PROPOSAL
Historic Structures	No impact.	<p>Rehabilitation of nature center would be done in accordance with Secretary's standards.</p> <p>Closure of Zion Canyon road during peak times would reduce number of visitors and therefore visitor-use demands on historic structures.</p>	<p>Rehabilitation of nature center same as for alternative one.</p> <p>Effect of addition of shuttle stops at Grotto, Lodge, and The Narrows trailhead is unknown. SHPO would have opportunity to review and comment on design drawings.</p> <p>Removal of South Campground comfort station would have an adverse effect on that structure. The building would be recorded to the standards of the Historic American Building Survey prior to removal.</p>	<p>Construction of buildings in maintenance area and Oak Creek housing area would have no adverse effect on historic district.</p> <p>The effect of addition of shuttle stops same as described under alternative two. Shuttle stop structures would meet Secretary's standards for rehabilitation.</p> <p>Realignment of access road to Watchman housing area and addition of shuttle stop near nature center would have no adverse effect on that structure.</p> <p>If ditches in canal open ditch system buried, would be an adverse effect, but if they are adapted, would have no adverse effect.</p>
Ethnographic Resources	Ethnographic significance of area is not known. If disturbance is already occurring, it would continue.	Same as no-action.	Because of possible cultural associations, American Indian and ethnic groups would be consulted.	Same as alternative two.

RESOURCE	NO-ACTION ALTERNATIVE	ALTERNATIVE ONE	ALTERNATIVE TWO	PROPOSAL
Visitor Use	Continued and increasing crowding at visitor facilities, along trails, and at parking areas.	<p>Reducing visitor center hours would reduce opportunities for visitors to receive general park and interpretive information. This information would have to be found elsewhere.</p> <p>Closure of canyon at peak times would disperse visitors to other parts of the park, and/or reduce their length of stay.</p> <p>Expansion of concessioner's shuttle system into campgrounds may require an additional fee to visitors. Overall experience of the campers who ride the shuttle could be enhanced by this alternate access to canyon.</p> <p>Required campground reservations would decrease visitors roaming through, looking for a site. Temporarily, until reservation requirement known, visitors expecting campsite would be inconvenienced. Should funding become limited and campgrounds closed, 381 sites would be lost. Commercial camping companies would be impacted, as they would be required to find camping areas outside the park.</p> <p>Bike path would also provide alternate means of experiencing park and would be expected to enhance visitors' experience, maybe increasing length-of-stay.</p> <p>Junior Ranger Program may need to be cancelled during</p>	<p>An expanded visitor center would expand the visitor's opportunities to participate in the interpretive program. Interpretation on the shuttle buses would also expand their knowledge of park resources, history, and values.</p> <p>It is not known what effect the system would have on visitor experience in the canyon. Some may prefer it as a way to see and access the canyon, others may dislike it and see it as a hindrance.</p> <p>Removal of campgrounds would eliminate 381 campsites and the opportunity to experience clear, quiet night skies in a national park.</p> <p>The bike path would provide an additional mode of transportation into the canyon, and is expected to enhance the visitor experience.</p> <p>Junior Ranger Program affected as in alternative one.</p>	<p>Relocating the visitor center to the transit center would provide general park information, interpretation, and visitor comfort facilities at one location.</p> <p>Shuttle system would have same impacts as described for alternative two.</p> <p>Implementation of shuttle system based in Watchman Campground and redesign of campgrounds would reduce total number of campsites. Campsite reservations would impact visitor as described for alternative one.</p> <p>Same as alternative two.</p> <p>Junior Ranger Program would continue to provide it's current</p>

RESOURCE	NO-ACTION ALTERNATIVE	ALTERNATIVE ONE	ALTERNATIVE TWO	PROPOSAL
Socioeconomic Resources/ Regional Land Use	Impacts to surrounding communities would continue to grow. Overloaded infrastructure in town of Springdale would become more overloaded with rising vehicle and visitor counts. This also puts a burden on the townspeople and community atmosphere.	<p>Impacts to surrounding communities of closing Zion Canyon road during peak season and eliminating interpretive facilities from visitor center not known. Visitors blocked from canyon could spend time in other parts of park, could shorten park stay and spend more time and money in surrounding communities, or they could shorten trip and leave area.</p> <p>Impacts on tour bus operators also not known for same reasons. If information that was received at visitor center could be provided on tour buses, there may be no reduction in visitor satisfaction.</p> <p>It is not known how surrounding towns would be impacted by the camping reservation system.</p> <p>Expansion of the concessioner's existing shuttle system to the campgrounds, would result in additional costs and revenues to concessioner.</p>	<p>Locating shuttle system staging area outside of park would increase parking in Springdale. Visitors would be in Springdale at least two times during the day, providing opportunity for businesses to attract customers. Given current condition of infrastructure, this could strain services and residents. Twenty percent of visitors are not expected to ride the mandatory shuttle, and they could spend time in other parts of park, spend time and money in surrounding communities, or leave the area.</p> <p>Mandatory shuttle system could provide an economic opportunity for concessioner or private contractor.</p> <p>Removal of campgrounds could impact town of Springdale, because campers purchase supplies there. Removal of campgrounds would create void for camping in the area, opening opportunity for private development.</p> <p>Relocation of administrative offices out of park would add to local economy through construction of space, rental of space, and miscellaneous spending by employees.</p>	<p>Shuttle system would have similar impacts on economy of town of Springdale as described in alternative two.</p> <p>Implementation of the shuttle system as a concession operation would provide an economic opportunity for the existing concessioner or a private contractor.</p> <p>Opportunities for camping in the park would be reduced, creating additional demand on private sector to provide this service.</p> <p>Construction of facilities would have a short-term, positive impact on local economy.</p>

AFFECTED ENVIRONMENT/ENVIRONMENTAL CONSEQUENCES

NATURAL RESOURCES

Vegetation

Existing Conditions. The vegetation in the park is relatively sparse in many areas due to the unstable and easily erodible soils, the dry air, and high summer temperatures. A narrow corridor of riparian zone is associated with the Virgin River and its floodplain. Fremont cottonwood is the dominant species, but box elder, velvet ash, and willow are common in the riparian area.

On narrow ledges above the river are drier benches and open areas of pinyon-juniper woodland. Thickets of short evergreens and oaks are interrupted by open flats covered with low shrubs. Species in this community include yuccas, gambel oak, Utah serviceberry, singleleaf and littleleaf mountain mahogany. Considerable areas on gentle slopes at the edges of this woodland are covered with silvery sand sage. (See Vegetation map, appendix 2.)

Impacts of the No-Action Alternative. Continued visitor use would result in the riparian and pinyon-juniper communities being trampled throughout the campgrounds, around parking areas, vehicle pulloffs, visitor facilities, and along trails. Continuation of current conditions would result in continued trampling and park managers erecting more fences around visitor-use areas to protect vegetation.

Under existing conditions, the cottonwood, box elder, and velvet ash trees in the campgrounds would continue to suffer from insufficient amounts of water due to the poor irrigation system, which stifles rejuvenation of these species, while at the same time these ditches encourage growth of exotic plant species along their edges.

Impacts of Alternative One. Implementation of alternative one would reduce the number of people in Zion Canyon at one time, thereby reducing the impacts on the riparian and pinyon-juniper communities around parking lots and visitor facilities and along trails in the canyon. In the headquarters area fewer visitors would be stopping at the visitor center and not staying as long, therefore, impacts to vegetation around this area would be reduced. A campground reservation system would reduce the number of people looking for campsites, but the total number of sites would remain the same and localized trampling and destruction of the riparian and pinyon-juniper woodland vegetation would continue.

Redesign of the campgrounds would remove and relocate some existing roads and campsites to improve the circulation system, reduce the amount of spur roads, and

clearly designate campsites. This is estimated to result in a net gain of approximately 1 acre of vegetation in the riparian zone.

The cottonwood, box elder, and velvet ash trees in the campgrounds would also continue to suffer from insufficient amounts of water due to the poor irrigation system, which stifles rejuvenation of these species. These ditches also encourage growth of exotic plant species along their edges.

Construction of the bike trail could remove 1.0 acres of vegetation in the riparian zone. Refer to the Denver Service Center bike trail DCP/EA for more specific information on the impacts due to construction of that trail.

Impacts of Alternative Two. Construction of buildings, roads, parking, and trails, in the park would result in a loss of 2.8 acres of vegetation in the riparian and pinyon-juniper zones. Construction of the staging area and shuttle maintenance facilities on the 80-acre BLM site outside the park would permanently remove up to 7.8 acres of vegetation. When the campgrounds are removed, 9.5 acres of roads and campsites in the riparian and pinyon-juniper zones would be revegetated. Therefore, there would be a net loss of 1.1 acres of vegetation (0.3 percent of the total study area).

Implementation of a shuttle system would drastically reduce the number of vehicles in the canyon and control the number of visitors at popular use areas at any one time, thereby decreasing the impacts of visitor trampling to the riparian and pinyon-juniper communities.

Prior to installation of utilities and other construction activities, topsoil from disturbed areas would be set aside and replaced following construction, minimizing the loss of organic material in the soil. These areas would be reseeded with native species to speed the rate of recovery and to minimize the encroachment of invading species. To the maximum extent possible, water runoff from impervious structures would be directed to natural drainages, minimizing the impacts of increased moisture availability. Continuation of the irrigation system would promote vegetation recovery in the campgrounds.

Impacts of the Proposal. Construction of buildings, roads, parking, trails, and redesigned campsites would remove 18.3 acres (of which 7.8 acres are for the transit center and parking) of vegetation in the riparian and pinyon-juniper zones. Permanent revegetation would include 8.3 acres of roads and campsites in the redesigned campgrounds, and other roads proposed to be removed. Therefore, there would be a total net loss of 10 acres of vegetation in the riparian and pinyon-juniper zones (3 percent of total acreage in the study area). Mitigation of disturbance due to construction activities would be the same as described in alternative two.

Implementation of a shuttle system would drastically reduce the number of vehicles in Zion Canyon and would control the number of visitors at popular use areas at any one time, thereby decreasing the overall impacts of trampling on the riparian and pinyon-

juniper communities throughout the park. Some localized trampling of vegetation could continue around highly used visitor areas.

A reduction in the number of campsites and redesign of the campgrounds, roads, parking areas, tent sites, and placement of comfort stations, trash containers, water supply, and footpaths, would reduce the social trails throughout the campgrounds and therefore the trampling and destruction of vegetation.

Implementation of a pressurized irrigation system in the campgrounds would promote maintenance of the existing cottonwood, box elder, and velvet ash populations in the campgrounds and promote rejuvenation of these species. A plant nursery in the park would provide a convenient supply of native material to aid revegetation.

Soils

Existing Conditions. According to the Soil Conservation Survey, there are two kinds of soils within the study area; Naplene silt loam and Redbank silty clay loam. The Naplene silt loam is composed of sandy loam, loam, fine sand, and gravelly loam and is found in broad alluvial valleys and on terraces along streams. These soils are found on very shallow slopes of 2 to 6 percent. The soils are deep and well-drained, and runoff is medium. The permeability ranges from moderately rapid to very slow, and the hazard of erosion is moderate. Depth to bedrock is usually greater than 5 feet. The high potential frost action of this soil results in a rating of severe construction limitations for roads, streets, and dwellings. For picnic sites or trail construction there are slight limitations. For camping and playground construction, limitations are moderate.

Redbank silty clay loam consists of well-drained soils found on alluvial floodplains along the Virgin River. Slopes range from 0 to 2 percent. It is composed of a fine sandy loam with a surface layer of silty clay. Permeability is moderate. Runoff is slow and the hazard of erosion is slight. Depth to bedrock is greater than 5 feet. Moderate construction limitations apply to this soil type (see Soils map, appendix 3).

Impacts of the No-Action Alternative. The primary impact on soils would continue to be compaction, which would decrease permeability, locally alter the soil moisture, and diminish the water storage capability. This would result in slower rates of water transmission within soils, increased runoff on the surface, and increasing soil erosion. Prolonged trampling would gradually decrease vegetation and increase exposure of bare ground to the direct erosive impact of rainfall. Erosion would take the form of channelization on barren areas of even slight slope.

Impacts of Alternative One. Compaction and erosion of soils due to visitor trampling at parking areas, along roads and trails, and around visitor facilities would be decreased slightly by reducing the number of people using these areas at one time.

Redesign of the campgrounds would remove and relocate some existing roads and campsites to improve the circulation system, reduce the amount of spur roads, and clearly designate campsites. Roads and campsites removed would be revegetated. This is estimated to result in a net improvement to 1 acre of soil.

Impacts of Alternative Two. Construction of buildings, roads, and trails in the park would impact 5.8 acres of both soil types. Construction of the transit center outside the park would impact up to 7.8 acres. Closure of the campgrounds would result in elimination of visitor impacts on soils and revegetation of 9.5 acres of roads and campsites. Therefore, there would be a net impact on 4.1 acres of soils (1.2 percent of the total study area).

A shuttle system would help control the number of people at one time on trails, at parking areas, and at visitor facilities, which would reduce localized compaction and erosion of soils.

Any construction site where soil is disturbed would undergo accelerated erosion, at least temporarily, until drainage structures are fully operable and vegetation recovers in cleared areas. Construction of the staging parking area and other impervious structures would be restricted to the minimum area required for building. Topsoil would be retained and replaced where possible in order to conserve available organic matter. Most visitor developments would be constructed where the slopes are less than 15 percent to minimize the soil erosion created by foot traffic. Paved trails would be provided where heavy foot traffic is anticipated, and visitors would be encouraged to stay on maintained trails. Buildings, roads, parking lots, and other impervious structures would be designed to collect and divert precipitation to natural drainages.

Impacts of the Proposal. Implementation of a shuttle system would contribute to an overall reduction in soil compaction and erosion. A shuttle system would reduce the number of vehicles in the canyon and the amount of illegal parking off the road, thereby reducing the amount of soil compaction and erosion. It would also control the concentration of visitors at one time along trails and at popular visitor-use areas, which would reduce soil compaction and loss.

Construction of buildings, roads, parking, trails, and rehabilitated campsites would impact 21.3 acres of both soil types. Revegetation would include 8.3 acres of roads and campsites in the redesigned campgrounds, and other roads proposed to be removed. Therefore, there would be a total net impact of 13 acres (4 percent of total acreage in the study area). Mitigation of disturbance from construction activities would be the same as described in alternative two.

Construction in the Naplene soil type (the Watchman housing area, Oak Creek area, Headquarters area, and South Campground), may require the application of specialized

construction methods because of the frost action in this area. Mitigation of impacts during and after construction would be the same as stated for alternative two.

Geology

Existing Conditions. Zion National Park is on the western edge of the Colorado Plateau. The park is composed of deeply eroded canyon with high, timber-covered plateaus and mesas. The canyons and adjoining terraces were formed by erosion of flat-lying rocks piled in an orderly succession, but differing in durability and hardness. The North Fork of the Virgin River has carved a deep gorge for about 12 miles that eventually opens into the broader Zion Canyon surrounded by 2,000-3,000-foot sandstone cliffs.

During the site analysis phase of the planning process, a geologic evaluation was done in the study area to determine the presence or absence of destructive landforms and associated drainage problems. The areas evaluated are shown on the Geologic Hazards map in appendix 4. An outcrop of rock up slope from the maintenance facility contains a number of loosened rock fragments that have the potential of separating and rolling into the maintenance compound. Construction of a heavy barrier fence and rock catchment at the base of this slope is recommended. Two definite hazard stones were noted in the Oak Creek corridor. One lies easterly from the small group of residences at the confluence of the Bee Hive Peek drainage and Oak Creek. Another is up slope, south westerly from the fork in the Oak Creek access road (see Geologic Hazards map). Removal of these stones is recommended.

Area 1 contains the area north of the road Oak Creek road, between the Oak Creek Housing area and the visitor center. It is considered acceptable in terms of hazard geology. Because Oak Creek divides this area mound-type diking should be used to protect any structures built in this area from flooding. The area between the Virgin River and the main park highway (area 2) is not considered a high risk flood area due to the enlarged channels and the capacity for flood proofing with mound-type diking. There is a zone of severe slope wash (area 3) just downstream from the gauging station that appears to be the westerly route for old avalanche material and flash flood water from Bridge Mountain into the Virgin River. The bend in the river supports this route as a depositional zone. Development should be avoided in this area. Barrier fences are recommended along the easterly boundaries of the flat, open areas to the north and south sides of this drainage (area 3b), if development is to occur near here. Area number 4 lies between the Virgin River and the terminus of a long ridge. This area is considered geologically stable but is subject to sheet flow runoff (of sand and silt) from high relief south of Bridge Mountain. If this area is developed, channelization of runoff would control the amount of sand and silt runoff into the development.

Impacts of the No-Action Alternative. For health and safety reasons, the geologic hazard stones would be removed.

Impacts of Alternative One. For health and safety reasons, the hazard stones would be removed. There are no construction activities associated with this alternative that would be affected by the critical geologic areas.

Impacts of Alternative Two. Construction of the emergency services building near the existing administration building may require that mound-type diking be constructed to protect it from potential flooding. This would be determined at the time the exact location of the building is known. For health and safety reasons, the hazard stones would be removed.

Impacts of the Proposal. Construction of buildings in the maintenance area would result in cutting into the slope and removing approximately 1,500 cubic yards of soil and rock material. A rock catchment and barrier fence would be constructed to protect this area from rockfalls. The hazard stones identified in Oak Creek Canyon would be removed. Channelization of runoff from Bridge Mountain into area 4 would be considered during the design of the proposed road to the South Campground.

Threatened and Endangered Species

Existing Conditions. The following is the list of Threatened, Endangered and Candidate species from the U.S. Fish and Wildlife Service, dated June 29, 1993, that may occur in the study area.

Listed Endangered:

American peregrine falcon	<i>Falco peregrinus anatum</i>
Bald eagle	<i>Haliaeetus leucocephalus</i>

Listed Threatened:

Desert tortoise	<i>Gopherus agassizii</i>
Mexican spotted owl	<i>Strix occidentalis lucida</i>

The American peregrine falcon has four territories on upper canyon walls above the project area. No critical habitat has been designated for the species. In 1993, six young were successfully fledged from eyries at Mountain of the Sun, Tunnel West, and the Great White Throne.

The Bald eagle is a winter migrant along the Virgin River in the study area. It perches in trees along the riparian corridor and is presumed to fish from the stream.

The Desert tortoise has been seen in the study area but it is not thought to be a permanent resident. A small population exists in Springdale, south of the study area.

The Mexican spotted owl uses narrow slot canyons adjacent to Zion Canyon for nesting, roosting, and foraging. Some of these canyons are accessible to and used by hikers.

To date, there has been no evidence of adverse impacts on this species because of visitor use nesting areas.

Candidate:

Arizona southwestern toad	<i>Bufo microscaphus microscaphus</i>
Northern goshawk	<i>Accipiter gentilis</i>
Ferruginous hawk	<i>Buteo regalis</i>
Southwestern willow flycatcher	<i>Empidonax traillii</i>
Flannelmouth sucker	<i>Carostomus latipinnis</i>
Virgin spinedace	<i>Lepidomeda mollispinis mollispinis</i>
Merriam's kangaroo rat	<i>Dipodomys merriami frenatus</i>
Spotted bat	<i>Euderma maculatum</i>
Nevada willowherb	<i>Epilobium nevadense</i>
Utah spike-moss	<i>Selaginella utahensis</i>
Jones golden-aster	<i>Heterotheca jonesii</i>
Canaan daisy	<i>Erigeron Canaanii</i>
Cliff jamesia	<i>Jamesia americana var. zionis</i>
Paria scurf-pea	<i>Pediomelum pariensis</i>
Sand-loving beardtongue	<i>Penstemon ammophilum</i>
Cedar Breaks goldenbush	<i>Haplopappus zionis</i>
Zion daisy	<i>Erigeron sionis</i>
Zion tansy	<i>Sphaeromeria ruthiae</i>
Chuckwalla	<i>Sauromalus obesus</i>
Zion Canyon snail	<i>Physella zionis</i>

The Arizona southwestern toad is found in shallow streams along the Virgin River in the project area. Observations in 1993 confirmed its presence in Oak Creek, a tributary of the Virgin River, adjacent to the headquarters complex, as well as in the main stream of the Virgin River.

The Northern goshawk is generally found in high elevation forest areas, in habitat similar to that of the Mexican spotted owl. There have been no confirmed sightings of this species, but it is likely to occur.

In the past, the Southwestern willow flycatcher was seen in Zion Canyon during the breeding season; however, no recent sightings confirm its presence.

The Flannelmouth sucker was confirmed in the North Fork of the Virgin River throughout the project area during electrofishing surveys conducted in 1992 by Hardy, Addley, and Associates.

The Virgin spinedace was also found in the North Fork of the Virgin River during electrofishing surveys in 1992, below Menu Falls downstream to the south park boundary.

The Spotted bat may occur within the project area near bodies of water.

The Chuckwalla has been sighted within the project area. It is presumed to be more common south of the project area along rocky ledges of the low canyons and washes.

The Zion Canyon snail exists on wet walls associated with springs, seeps, and hanging gardens. There is the potential for, but no documentation of the snails being dislodged from their habitat or being stepped on and killed, by visitors climbing around the springs, seeps, and hanging gardens to take photos of the vegetation.

Impacts of the No-Action Alternative. Under the no-action alternative, visitor use in areas accessible to the above mentioned species, would continue, therefore, the potential for impacts to those species would continue. However, further study is needed to determine which, if any, are being affected by visitor use. Current preventative methods, such as building boardwalks and fences to confine use and protect areas would continue to be implemented as needed.

Impacts of Alternative One. Controlling the number of people in Zion Canyon at one time during the peak visitor season should reduce the concentration of people on trails, roads, and at popular visitor-use areas, but visitors would still have access to areas where the above-mentioned species may be found. With a reduction in use, however, this alternative is not likely to adversely affect those species, and should actually be of benefit to those species. Current preventative methods, such as building boardwalks and fences to confine use and protect areas would continue to be implemented if needed. Also, a visitor experience and resource protection process would create a means for monitoring if and where, visitor use is impacting threatened or endangered species, and for determining mitigation actions.

Impacts of Alternative Two. Implementation of a shuttle system would help control the number and concentration of people in Zion Canyon. The scheduling and routing of buses would be adjusted throughout each day to control how many people are dropped off at visitor-use areas and trailheads to minimize the congestion. Closure of the campgrounds would also remove approximately 1,000 people per day from that area. Although the number and concentration of people would be reduced, visitors would continue to have access to areas where the above-mentioned species may be found. It is believed, however, that this alternative is not likely to adversely affect those species and should actually be of benefit to those species. Current preventative methods, such as building boardwalks and fences to confine use and protect areas would continue to be implemented if needed. A visitor experience and resource protection process would create a means for monitoring of if and where visitor use is impacting threatened or endangered species, and for determining mitigation actions.

Impacts of the Proposal. Implementation of a shuttle system would help control the number and concentration of people in Zion Canyon. The scheduling and routing of buses would be adjusted throughout each day to control how many people are dropped off at visitor-use areas and trailheads to minimize the congestion. Although the number and concentration of people would be reduced, visitors would continue to have access to areas where the above-mentioned species may be found. It is believed, however, that the proposal would not likely adversely affect those species and should actually be of benefit to those species. Current preventative methods, such as building boardwalks and fences to confine use and protect areas would continue to be implemented if needed. In addition, a visitor experience and resource protection process would create a means for monitoring of if and where visitor use is impacting threatened or endangered species, and for determining mitigation actions.

Wildlife

Existing Conditions. The headquarters area is within mule deer and desert bighorn sheep habitat. Desert bighorn sheep have been reintroduced in the park and are found along the Watchman Trail during the low visitor-use season. Because of this, there are visitor/bighorn encounters, but they are few. The mule deer browse, feed, and find cover, water, and shade in the study area. Deer have been known to bear their fawns throughout the headquarters area. A lack of predators because of the amount of physical development in the area, past cultivation practices, and protection from hunting, are all believed to contribute to the concentration of deer in this area. Migratory waterfowl, great blue heron, bald eagles, and neotropical migrant birds use the riparian habitat along the North Fork of the Virgin River within the study area.

The Sonoran woodrat, white-tailed antelope squirrel, gold mantled ground squirrel, and occasionally the roadrunner are found within the riparian habitat, the canyon floor, and benchlands, along trails, and in the campgrounds. Coyote, mountain lion, and bobcat mostly just pass through the area. Beaver are found in the Virgin River throughout the main canyon. Gray fox and ringtail cat are also common in the area. Feral dogs and cats left behind by visitors are found in the area.

Impacts of the No-Action Alternative. Visitor/wildlife conflicts on roads and trails and around highly used visitor facilities, and visitors wading, tubing, and fishing in the river, would continue to be potential impacts on wildlife in the study area. Current preventative methods, such as building boardwalks and fences to confine use and protect areas would continue to be implemented as needed.

Impacts of Alternative One. Actions proposed in this alternative would reduce the number of people at one time around the visitor center, in Zion Canyon, and in the campgrounds. A reduction in the number of vehicles in the canyon would reduce the potential for vehicular/wildlife conflicts on the road, along trails, and around visitor-use areas. A reduction in the number of vehicles and people would also result in a reduction

in noise levels. This alternative is not likely to adversely affect wildlife and may result in an overall benefit to wildlife populations. In addition, implementation of a visitor experience and resource protection process would create a means for monitoring if and where visitor use is impacting wildlife, and for determining mitigation actions.

Impacts of Alternative Two. Removal of the campgrounds would reduce the concentration of visitors and vehicles in the area, the noise level, the number of people recreating in the river, and the potential for visitor/wildlife conflicts. Also, the campgrounds would be revegetated after being closed. This would increase habitat, which is expected to increase all wildlife populations found in the area. An increase in wildlife populations is not likely to adversely affect them, with the exception of the deer population. An increase in the deer population may not be beneficial to the overall deer population in the long term and they would need to be monitored. Implementation of a visitor experience and resource protection process would create a means for monitoring if and where visitor use is impacting wildlife, and for determining mitigation actions.

Impacts of the Proposal. Implementation of a shuttle system would reduce the concentration of visitors and vehicles, and noise levels on the roads, in the canyon, on trails, and at major visitor-use areas during the peak visitor-use season. Proposed development would occur within already developed areas, and would not be impacting undisturbed areas or significantly reducing open space. Relocating the visitor center to the transit center area in the existing Watchman Campground would remove visitors from the area around the existing visitor center where mule deer are commonly found. Therefore, it is believed that implementation of the proposal is not likely to adversely impact wildlife and may result in an overall benefit to all wildlife populations in the area. In addition, implementation of a visitor experience and resource protection plan would create a means for monitoring if and where visitor use is impacting wildlife, and for determining mitigation.

Water Resources/Floodplains/Wetlands

Existing Conditions. The North Fork of the Virgin River is the main drainage through Zion Canyon. The river experiences wide fluctuations in flow with a seasonal snowmelt peak in the spring followed by generally low summer and fall flows. Occasional heavy storms, which can occur at any time of the year but are most common in summer and early fall, produce the largest flows in the Virgin River system. These runoff events are usually of short duration and can occur suddenly.

The segment of the North Fork of the Virgin River through the study area is considered eligible for recreational classification under the Wild and Scenic Rivers Act. Under the Natural Resource Management Guidelines, NPS-77, eligible wild and scenic rivers will be managed in accordance with "National Wild and Scenic Rivers System; Final Revised Guidelines for Eligibility, Classification and Management of River Areas."

Through much of the headquarters area, the 100- and 500-year floodplains closely follow the banks of the river. The existing earthen levee constructed along the riverbank through the Watchman Campground altered the historic floodplains in this area, but now contains the 100- and 500-year floods. Removal or failure of this levee would result in flood waters encroaching into the campground. The probable maximum flood area flows out into open areas and the campgrounds. There is one historic residence within the Oak Creek 100-year floodplain, and 8-10 campsites in the Watchman Campground are in the 100-year floodplain of the Virgin River. Two homes along Oak Creek are in the 500-year floodplain (see Floodplains map, appendix 6). There is a flood warning system and evacuation plan in place in the park.

Wetland habitat within the development zone, with the exception of artificially irrigated areas, is found only in very close association with the North Fork of the Virgin River and its tributaries. If the incised flood channels in the development zone are avoided, wetlands will not be directly impacted. An elaborate system of irrigation channels exists throughout the development zone. The main channels tend to support a narrow fringe of wetland vegetation, while other less frequently used channels do not. Since the borders of these channels and the artificially irrigated campgrounds that the channels serve would revert quickly to upland desert vegetation if irrigation ceased, these areas are normally exempt from federal Clean Water Act Section 404 regulation.

There are a number of historic and nonhistoric irrigation ditches throughout the headquarters area, some of which are no longer functioning. Functioning ditches include Oak Creek Canal (a historic structure) and Flannigan's Ditch. The Oak Creek Canal irrigates the South Campground through an open ditch system, and Flannigan's Ditch irrigates the Watchman Campground. Water in Flannigan's Ditch is piped from the Virgin River to the campground, but through the campground it is an open ditch system. The Springdale Ditch Company diverts water from the Virgin River to the town of Springdale via Flannigan's Ditch. (Refer to the "Cultural Resources" section for a discussion on the historic canals.)

Impacts of the No-Action Alternative. The development of the bike trail would have a minor effect on the wild and scenic river eligibility but it would still be consistent with recreational classification of this river segment.

Construction of the bike trail, footbridges, and river access points, is not likely to adversely impact wetland vegetation. The path and defined access points to the river are expected to reduce the overall indiscriminate access and impact to wetland vegetation within the river channel. Mitigation would consist of revegetating disturbed areas. An EA is being prepared specifically for the bike path by the Denver Service Center as part of the design and construction documents preparation process. Refer to that document for more specific information.

No other construction activities are proposed under this alternative that will affect the floodplains or wetlands in the study area. Sites within the campground would remain in the 100-year floodplain and approximately half of both campgrounds are in the probable maximum flood zone. The park's evacuation system will remain in the campgrounds. The potential for damage by flooding to the residences in or near the 100-year floodplain would be reduced by building dikes or other protective structures around them. It is estimated that 30 people could be in the 100-year floodplain at one time (PAOT), and 745 could be in the probable maximum flood area.

Visitor use of the Virgin River may be affecting the water quality and the wetland vegetation within the river channel, however, there is no quantitative evidence of this. The potential for this would continue under this alternative.

Impacts of Alternative One. The development of the bike trail would have a minor effect on the wild and scenic river eligibility but it would still be consistent with recreational classification of this river segment.

Redesign of the Watchman campground would remove the campsites from the 100-year floodplain and reduce the number of people in the 100-year floodplain to 2 (the residents in Oak Creek Canyon). However, as long as the campgrounds remain in use and within the probable maximum flood area, the flood warning and evacuation system would provide adequate time for evacuation and would remain in effect. Should park managers close the campgrounds because of low funding, there would no longer be threats of flooding to campers and potential for impacts to wetland vegetation would be reduced. There are no anticipated adverse effects to the natural and beneficial floodplain values under this alternative.

Construction of the bike trail, footbridges, and river access points, is not likely to adversely impact wetland vegetation. The path and defined access points to the river are expected to reduce the overall indiscriminate access and impact to wetland vegetation within the river channel. Mitigation would consist of revegetating disturbed areas. An EA is being prepared specifically for the bike path by the Denver Service Center as part of the design and construction documents preparation process. Refer to that document for more specific information.

Impacts of Alternative Two. Implementation of this alternative would reduce the evidence of human activity and the impacts on the eligible stream segment. This alternative would be most beneficial relative to the outstandingly remarkable values and wild and scenic river eligibility. However, under this alternative, the enhancements would not be great enough to move the segment in question from recreational to scenic classification eligibility.

Removal of the campgrounds would remove visitors from the floodplain and the potential for personal injury due to flooding. Alternative two reduces the number of people at one time in the floodplain. The residential areas remain in the flood area, and it is estimated that 2 people could be in the 100-year floodplain at one time, and 145 could be in the probable maximum flood area. The potential for damage by flooding to the residences in or near the 100-year floodplain would be reduced by building dikes or other protective structures around them and the evacuation system would remain in effect. Mound type diking near the emergency services building would protect it from potential flooding. Implementation of this alternative is not anticipated to adversely impact the natural and beneficial values of floodplains. Removal of the campgrounds may also contribute to groundwater recharge because the removal of visitors would reduce soil compaction.

Removal of the campgrounds would reduce the number of people using the area and recreating in the river. This would reduce the potential for impacts on wetland vegetation within the river channel and may improve water quality. Total water consumption would also be reduced by the reduction in visitors.

Construction of the bike trail, footbridges, and river access points, is not likely to adversely impact wetland vegetation. The path and defined access points to the river are expected to reduce the overall indiscriminate access and impact to wetland vegetation within the river channel. Mitigation would consist of revegetating disturbed areas. An EA is being prepared specifically for the bike path by the Denver Service Center as part of the design and construction documents preparation process. Refer to that document for more specific information.

Impacts of the Proposal. The development of the bikeway, campground modifications, a visitor/transit center, additional park employee housing, and bridges, will not detract from the recreational character of this stream segment. This area already has substantial evidence of human activity, residential and commercial structures, and is currently readily accessible and proposed actions are consistent with the recreational classification eligibility.

Because of the physiographic characteristics of the headquarters area, a narrow valley confined by tall canyon walls with a river running the length of it and two creeks flowing into the river, much of the existing development, especially the campgrounds and the Oak Creek housing area, is within the probable maximum flood area. There are few, flat, open areas outside the probable maximum flood area, that are free of archeologic sites, on which to develop or relocate facilities. Construction of the transit/visitor center would be within the probable maximum flood area and protected from the 100- and 500-year floods by the existing earthen levee. The structural integrity of the existing earthen levee in this area, would be monitored to ensure its continued effectiveness. Camping in the headquarters area has been determined an appropriate visitor use and because of the lack of alternative locations for campgrounds in the study area, they will remain in their

existing locations. Redesign of the campgrounds would however, remove campsites from the 100-year floodplain. Because of the shortage of available, affordable housing outside the park, the proposal adds employee housing units to the Watchman Housing area, a portion of which is also within the probable maximum flood zone.

The transit/visitor center and employee housing would increase the number of people at one time in the probable maximum flood area. It is estimated that 800 people could be in the probable maximum flood area at one time. However, the number of people in the 100-year floodplain would drop to 2, because camping would be removed from this floodplain, leaving only the one residence in the floodplain.

The evacuation plan and warning system would provide adequate time for evacuation and would remain in effect. This flood plan would mitigate potential loss of life situations.

Natural and beneficial floodplain values include, water resource values (natural moderation of floods, water quality maintenance, and groundwater recharge), living resource values (fish, wildlife, and plant resources), and cultural resource values (natural beauty, scientific study, outdoor education, and recreation). Construction of the transit/visitor center, parking area and bus loading/waiting area would cover a total of 7.3 acres and could affect groundwater recharge. Paved surfaces prevent water absorption and increase runoff. However, the overall impact of this is expected to be minimal and mitigation could include using permeable building materials or retaining the water until it can be absorbed or discharged at a reasonable rate. No other impacts are anticipated to the natural or beneficial floodplain values.

The potential for damage by flooding to the residences in or near the 100-year floodplain in Oak Creek Canyon would be reduced by building dikes or other protective structures around them. Mound-type diking near the emergency services building would protect it from potential flooding. These protective measures are not likely to adversely impact the natural or beneficial floodplain values. If channelization of runoff is needed to protect the proposed entrance road to the South Campground, the channel could be designed such that runoff is directed to go under the road and continue to flow naturally, which is not expected to impact floodplain values.

There are no anticipated secondary effects to floodplains or wetlands and there is no increase in flood loss potential to existing developments from the proposal. There are no State or local floodplain standards applicable to the proposal.

Construction of the bike trail, footbridges, and river access points is not likely to adversely impact wetland vegetation. The path and river access points are expected to reduce the overall indiscriminate access to the river along its entire length in the study area, and associated impacts to wetland vegetation within the river channel. The footbridges over the Virgin River and Oak Creek would be designed so they are outside of the channels where the wetlands exist. Mitigation of disturbed areas would consist of revegetating after

construction. An EA is being prepared specifically for the bike path by the Denver Service Center as part of the design and construction documents preparation process. Refer to that document for more specific information.

The vehicular bridge for the proposed new access to the South Campground would be designed so bridge abutments or other elements of the bridge do not impact the wetlands in the river channel, therefore there are no anticipated effects to wetlands.

Wilderness

Existing Conditions. The headquarters development management zone is surrounded by a natural management zone. Within the natural zone are two subzones; wilderness and natural environment. The wilderness subzone represents the resources that have been recommended for wilderness and are managed to protect the wilderness values. A wilderness area is one where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain. Wilderness areas offer values such as outstanding opportunities for solitude, or a primitive and unconfined type of recreation. Public purposes of wilderness include recreation, scenic preservation, scientific study, education, conservation, and historical use.

Impacts of the No-Action Alternative. Under this alternative, increasing visitor use in the headquarters area would probably increase noise levels along roads, at parking areas, around the visitor center and in the campgrounds. This could negatively impact the wilderness experience of those in the wilderness subzone.

Impacts of Alternative One. Reducing the hours the visitor center is open will force visitors to other parts of the park, some already crowded areas, and perhaps to areas of the park that are not currently highly used by visitors. This could increase traffic and noise levels, which could result in negative impacts to wilderness users.

Impacts of Alternative Two. Removal of the campgrounds and implementation of a shuttle system would decrease noise levels in this area, which could beneficially impact the wilderness experience of those in the planning area and in the proposed wilderness subzone.

Impacts of the Proposal. Implementation of a shuttle system would reduce noise levels, vehicular congestion, and perhaps the number of people in the headquarters area and Zion Canyon at one time. This could beneficially impact the wilderness experience of those in the proposed wilderness subzone. The concentration of visitors and vehicles at the transit/visitor center could increase noise levels and impact users in the wilderness area immediately surrounding the south entrance area.

Air Quality

Existing Conditions. Zion National Park is a mandatory class I clean air area designated under the 1977 Clean Air Act amendments (42 U.S.C. 7401 et seq.). Smoke from the campgrounds contributes to particulate matter in the canyon and could impair visibility. Because of the narrow confines of Zion Canyon, some air quality problem could develop. However, air quality monitoring done in the park in recent years, shows that the park has not violated the air quality standards.

Impacts of the No-Action Alternative. Under this alternative, no actions are proposed to reduce or limit the number of vehicles in the park or the total number of campfires; therefore, air quality could be affected by increasing vehicle congestion and campfires.

Impacts of Alternative One. Restricting the number of vehicles in Zion Canyon at one time, expansion of the concessioner's shuttle system to the campgrounds, and construction of the bike path should reduce the number of vehicles in the canyon and the amount of vehicle emissions in the canyon.

Impacts of Alternative Two. A shuttle system running during the peak visitor-use season and use of the bike trail instead of vehicles, would result in a decrease in total vehicle emissions in the park (see the Zion National Park Transportation Study, 1993). Congregation of vehicles at the shuttle staging area outside the park could slightly increase emissions at this point, but they would not be high enough to negatively impact air quality.

Removal of the campgrounds would reduce the number of vehicles in the park as well as eliminate campfires, which could be impairing visibility.

Construction of the transit staging area outside the park and shuttle stops inside the park would temporarily increase the amount of particulate matter in the air, but dust could be controlled by the application of water and other dust palliatives.

Impacts of the Proposal. Implementation of the transportation system and use of the bike trail, would reduce the number of vehicles driving through the canyon, thereby decreasing total vehicle emissions in the park (refer to the Zion National Park Transportation Study, 1993). Congregation of vehicles at the shuttle staging area would slightly increase emissions at this point, but they would not be high enough to negatively impact air quality.

Construction activities would temporarily increase the amount of particulate matter in the area, but dust could be controlled by the application of water and other dust palliatives.

Visual Resources

Existing Conditions. The dramatic scenery within the park is focused up to the nearly vertical canyon walls. Because views are "up" they are basically unobstructed by development in the headquarters area. Much of the development in the study area is of the "NPS-Rustic" architectural style. Most development is away from high visitor-use areas. Housing off main roads and screened with mature vegetation, and the maintenance yard is tucked away up Oak Creek. Parking areas are small or at different grades, which minimizes their visual impacts.

On a smaller, more human scale, trampling of vegetation by visitors at the major-use areas, the layout of, heavy use within, and closeness of the campgrounds to the main park road, the congestion caused by all the vehicles on the canyon road, and the number of people along trails and at visitor facilities, results in impacts to the overall visual quality of the park's headquarters area.

Impacts of the No-Action Alternative. As visitation continues to increase, visitor trampling of vegetation would continue around high visitor-use areas and in the campgrounds. As the vegetation dies in these areas, the visual quality will be reduced.

Impacts of Alternative One. Restricting the number of vehicles in the canyon at one time would reduce visitor use and trampling of vegetation, and aid in rejuvenation of vegetation and the overall quality of the scene.

Impacts of Alternative Two. Implementation of a shuttle system based outside the park would reduce the number of vehicles in the park and maintain the visual quality along roads and at parking areas. The shuttle transit center would require 7.8 acres of land to accommodate visitation, which would require careful attention during the design of the parking lot and facilities. The design phase would take into consideration surrounding development and the landscape, and implement principles of sustainable design to blend the new construction with its surroundings.

Removal and revegetation of the campgrounds would change the scene at the park's entrance from a developed area to a more natural scene.

To minimize the impact of the emergency services building, it would be designed to blend with the existing administration building and screened from view from the main road.

Impacts of the Proposal. Implementation of a shuttle system would drastically reduce the number of vehicles and visitors on roads, at parking areas, along trails, and at visitor-use areas, allowing the visual emphasis to be on the natural resources.

The transit/visitor center would require 7.8 acres of land to accommodate visitation, which would require careful attention during the design of the parking lot and facilities. The

design phase would take into consideration surrounding development and the landscape, and implement principles of sustainable design to blend the new construction with its surroundings. The Watchman Campground is heavily vegetated and the parking lot for the shuttle system would be designed to take advantage of this vegetation to screen the parking as much as possible. Redesign of the remaining campgrounds and burial of utility lines would enhance the views to and within the area.

Proposed operational and employee facilities would be located away from major visitor-use areas, and would be well-screened with existing vegetation. They would be designed and built to consider the scale and design of existing surrounding buildings and the landscape. All facilities would implement the principles of sustainable design to minimize visual impacts. The residences proposed in the Watchman housing area would have a temporary effect on the view from the top of the Watchman Trail, until vegetation matures to screen them as it now screens the campgrounds.

Noise Quality

Existing Conditions. Noise standards for health and welfare apply to this area. The park does not have monitoring devices installed to measure ambient sound levels. A noise impact assessment conducted in the park in the spring of 1993 states that most of the traffic noise is created by tour buses and that they would be distinctly audible at elevated viewpoints. The river sounds (a significant element of the natural history of the canyon), which are significantly different from car or tour bus noises, are not audible very far away from the river, and do not bend well around big banks or barriers. Because of these characteristics, the river is not particularly successful at masking the vehicular noise.

Generators on recreational vehicles and loud music create the greatest localized auditory impacts in campgrounds. Noise impacts also result from helicopters flying through the canyon area or landing at the helipad near the Watchman Campground.

Impacts of the No-Action Alternative. Under the no-action alternative, the major sources of noise would continue to be the tour buses. Noise impacts from helicopters would be reduced because they would be landing in the park less often under this alternative.

Impacts of Alternative One. Controlling the number of vehicles allowed in the canyon at one time during the peak visitor season would only slightly reduce the total level of noise created in the canyon. As long as tour buses are allowed in the canyon, noise levels will be high. Noise impacts from helicopters would be reduced because they would be landing in the park less often under this alternative.

Impacts of Alternative Two. Implementation of a shuttle system would reduce noise levels in the canyon. Because tour buses would be prohibited in the canyon, the greatest generator of noise would be eliminated. Noise pollution at elevated viewpoints from

canyon traffic would also be eliminated. In addition, the shuttle buses would use propane gas, which requires much quieter engines than typical tour buses. However, because some cars would still be allowed to drive up to the Zion Lodge and increases in vehicular speed would raise the car noise levels, strict speed controls would have to be enforced. Also, cars in the canyon would still cause higher and more offensive noise levels than the natural sound of the flowing Virgin River.

There may be localized increases in noise levels at the transit center because of the concentration of vehicles in one area. Closure of the campgrounds would permanently remove the noise caused by recreational vehicles and campers. Noise impacts from helicopters would be reduced because they would be landing in the park less often under this alternative.

Impacts of the Proposal. The impacts of the shuttle system on noise in the study area and canyon would be the same as stated for alternative two.

In addition, the noise assessment also states that if all tour buses and all cars were removed from the canyon, the natural acoustic environment in the canyon could be almost restored. That would mean that visitors in the canyon could hear the sounds of the river. Families picnicking on the east side of the Grotto would probably be able to hear the river, something that is not now possible. Hikers on the trail from the Grotto bridge to Heap's Canyon would also hear the river instead of traffic noise.

There may be localized increases in noise levels at the transit center because of the concentration of vehicles in one area. A reduction of the total number of campsites may also reduce the noise produced by the generators on recreational vehicles. Designating one area for recreational vehicle camping, separated from the tent-only campground, would reduce the impacts to tent campers. Noise impacts from helicopters would be reduced because they would be landing in the park less often under this alternative.

CULTURAL RESOURCES

Archeological Resources

Existing Conditions. Intensive surface surveys meeting the Secretary of the Interior's Standards for Archeology and Historic Preservation, have been conducted and have identified a number of sites in the study area. None of the sites have been nominated for the National Register of Historic Places although the majority of them appear to be eligible. Most documented remains including habitation ruins, ceramic and lithic scatters, and rock art within the study area appear to be associated with either Virgin or Western Anasazi groups dating from A.D. 1 to A.D. 1200 and/or the Southern Paiute group, dating from A.D. 1200 to present. Many sites are easily accessible to visitors and are susceptible to their collecting surface materials and leaving graffiti.

Prior to any development activities, these sites would be evaluated for their eligibility for listing on the National Register of Historic Places.

Impacts of the No-Action Alternative. As visitor use continues to increase, so would potential impacts to archeological sites. Mitigation consists of educating the visitor through park interpretive programs.

Impacts of Alternative One. Closure of Zion Canyon road during peak times would control the number of visitors in the canyon at one time and could reduce the potential for impacts to archeological sites in Zion Canyon. There are no actions proposed in this alternative that would impact archeological sites in the headquarters area.

Impacts of Alternative Two. Implementation of a shuttle system would control the number of visitors in the canyon at one time and may reduce the potential for impacts to archeological sites in the canyon. Prior to construction of shuttle bus stops and related facilities, all sites would require evaluation for eligibility for listing on the National Register of Historic Places.

The BLM site proposed as the location for the shuttle staging area outside the park, has not been surveyed for archeological sites. A survey and evaluation would be required prior to any construction.

Closure of the campgrounds would remove potential impacts to archeological sites in and around the campgrounds.

Impacts of the Proposal. Implementation of a shuttle system would control the number of visitors in the canyon at one time and may reduce the potential for impacts to archeological sites in the canyon. Prior to construction of shuttle bus stops and related facilities, all sites would require evaluation for eligibility for listing on the National Register of Historic Places. The BLM site proposed as the location for the shuttle staging area outside the park, has not been surveyed for archeological sites. A survey and evaluation would be required prior to any construction.

Removing camping from the immediate area of the site in the Watchman Campground would reduce the potential for impacts to that site.

The effect of realigning the road to the Watchman housing area on the archeological site in this area is not known. Prior to the comprehensive design stage, a qualified archeologist would evaluate the site for National Register eligibility. If the site is determined eligible and the NPS is unable to avoid the site through realignment of the road, data recovery pursuant to an approved data recovery plan (DRP) would occur. The Utah State Historic Preservation Officer and the Advisory Council for Historic Preservation would be given an opportunity to review and comment on the DRP.

There are two archeological sites in the vicinity of the existing Watchman housing area road, which is proposed to be converted to a pedestrian trail. One site is a shard scatter and approximately 50 percent of the visible artifacts were collected in 1978. Additional survey work was done in 1984, and the site could not be relocated. Further work will be done to identify that site and evaluate its eligibility. If artifacts are found they will be collected and added to the park's collection. Surface collection at the second site in the area is possible by converting the road to a trail. Therefore, that site should be evaluated for eligibility for listing on the National Register of Historic Places and the artifacts collected and placed in the park collection.

Historic Structures

Existing Conditions. The study area and Zion Canyon have been surveyed and evaluated for National Register eligibility. A park-wide, multiple resource nomination was completed in 1984. The significance of the historical resources within Zion National Park derive from their association with three historic themes: 1) pioneer Mormon settlement, 2) landscape architecture and transportation, and 3) "NPS-Rustic" architecture.

The multiple resource nomination did not address the identification and evaluation of resources that might qualify for the National Register of Historic Places because of cultural landscape values.

The following is a list of the historic structures in the headquarters area and Zion Canyon that are listed on the National Register of Historic Places.

<u>STRUCTURE</u>	<u>SIGNIFICANCE</u>	<u>HISTORIC USE</u>	<u>CURRENT USE</u>
Headquarters Area			
Crawford/Gifford Canal	Mormon Settlement	Irrigated Oak Creek	Nonfunctioning
Pine Creek Canal	Mormon Settlement	Irrigated area north of nature center	Nonfunctioning
Oak Creek Canal	Landscape Architecture	Irrigates South Campground	Same
Oak Creek H.D.	Architecture	Housing/maintenance	Same
Pine Creek H.D.	Architecture	Housing	Same
Zion Inn			
(Nature Center)	Architecture	Lodge	Interpretation
South Entrance Sign	Architecture	Sign	Same
South Campground			
Comfort Station	Architecture	Comfort station	Same
South Campground			
Amphitheater	Architecture	Amphitheater	Same
Virgin River Bridge	Transportation	Bridge	Same
Zion Canyon			
Gateway to the			
Narrows Trail	Transportation	Hiking trail	Same
Grotto Trail	Transportation	Hiking trail	Same
Angel's Landing Trail	Transportation	Hiking trail	Same
West Rim Trail	Transportation	Hiking trail	Same
Emerald Pools Trail	Transportation	Hiking trail	Same
Hidden Canyon Trail	Transportation	Hiking trail	Same
Zion Lodge/			

<u>STRUCTURE</u>	<u>SIGNIFICANCE</u>	<u>HISTORIC USE</u>	<u>CURRENT USE</u>
Birch Creek H.D.	Architecture	Cabins, dorms, bake shop, mattress shed, utility buildings, garages	Cabins, dorms, storage
Grotto Campground North Comfort Station	Architecture	Comfort station	Same
Grotto Campground South Comfort Station	Architecture	Comfort station	Same
Temple of Sinawava	Architecture	Interpretation	Same
Trailside Exhibit Bld.	Architecture	Interpretation	Same

The simple technology used to construct the Crawford/Gifford and Pine Creek canals has been modernized continuously over the years, but neither canal has been realigned or filled in. Their significance lies in their historic association with Mormon farming. All other resources associated with this particular historic theme, including some homestead sites and sites of former irrigation canals, have been evaluated and found to be non-contributing because of loss of integrity.

The Crawford/Gifford Canal diverted water from the Virgin River approximately 1 mile north of the present-day Virgin River Bridge. The canal is no longer functional, but its course is clearly visible. The Pine Creek Canal drew water off the Virgin River and Pine Creek immediately to the east of their confluence, and irrigated farmland between the east bank of the Virgin River and Bridge Mountain. The canal's delivery system has been refurbished and upgraded since its original construction.

The Oak Creek Canal was designed in 1935 by an NPS landscape architect to provide water to a system of lateral ditches that irrigated trees and shrubs planted in a reforestation program at the South Campground. The significance of the canal lies in its historical association with landscape architecture and none of the resources along its length are contributing elements.

The Virgin River Bridge was constructed in 1929 to connect the Zion-Mt. Carmel Highway with the floor of the Valley Highway. Constructed as a three-span bridge with steel I-beams, it was camouflaged with 54-inch redwood slabs to convey a rustic appearance. The bridge was altered in 1959.

The Oak Creek Historic District includes housing and maintenance facilities. The Pine Creek Historic District includes three houses and two garages, which have always served as residences for the park superintendent and other managers.

The nature center building was originally constructed as part of a concessionaire-operated complex consisting of the Zion Inn Cafeteria (nature center), a service station, and 120 guest cabins. In 1973, the NPS acquired the complex and removed all the buildings and structures except the nature center building. The building has had some exterior modifications and has had significant interior alterations. It is now used for the park's

Junior Ranger Program and employee training. Adaptive use is the management policy for this building.

The South Entrance Sign was constructed in 1933 by the CCC and was moved in 1987 to accommodate a two-lane exit and second fee collection station.

The South Campground Comfort Station was built in 1939 by the CCC. It retains its exterior integrity but has had substantial interior modifications.

The Gateway to the Narrows Trail was constructed in 1929 by park personnel and is one of the least strenuous and most popular trails in the park. It is used as both a naturalist-guided and self-guided walk. The trail follows the Virgin River to the north for 1 mile, where the canyon becomes so narrow that there is no longer room for both the river and the trail. From this point on, hikers are in the river.

The Grotto Trail begins north of Zion Lodge and runs parallel to the canyon floor for 0.5-mile to the south end of the Grotto Picnic Area. The trail is part of the original "Floor of the Valley Highway." The Angel's Landing Trail starts at Scout's Lookout on the West Rim Trail and runs along the edge of a narrow and steep-sided sandstone ridge. The trail climbs more than 300 feet in ½-mile. The West Rim Trail climbs a series of 17 switchbacks up a 60-degree chimney above Refrigerator Canyon. The Emerald Pools Trail links the upper, middle, and lower Emerald Pools. The Hidden Canyon Trail is carved into the sheer cliffs on the east wall of Zion Canyon above the Weeping Rock parking area.

The Zion Lodge/Birch Creek Historic District includes tourist cabins, the men's and women's dorms now used by the concessioner, the bake shop, the mattress shed, and utility buildings. The Zion Lodge, originally built in 1925, is a non-contributing building. After a fire in 1966, a prefabricated building was placed on the original foundation.

The Grotto Campground North and South comfort stations were built in 1925. The exteriors have not been modified, but the interiors have been changed over the years. Both are still in use.

The Temple of Sinawava Exhibit Building was constructed in 1936 and is still in use.

Impacts of the No-Action Alternative. No actions are proposed under the no-action alternative that would affect the historic structures.

Impacts of Alternative One.

<u>Structure</u>	<u>Action</u>	<u>Effect</u>	<u>Mitigation</u>
Nature Center	Rehabilitate	No adverse effect	Work meets Secretary's Standards for Rehabilitation

Zion Canyon Headquarters DCP/EA

Rehabilitation work on the nature center (HS-90) would be carried out in accordance with the Secretary of the Interior Standards for Rehabilitation (Section 9). This work is necessary to provide space for park employees.

Closure of the Zion Canyon road during peak times would reduce the number of visitors in the canyon at one time and would reduce visitor-use demands on historic structures

Impacts of Alternative Two.

<u>Structure</u>	<u>Action</u>	<u>Effect</u>	<u>Mitigation</u>
Nature Center	Rehabilitate	No adverse effect for Rehabilitation	Work meets Secretary's Standard
South Campground Comfort Station	Remove	Adverse	Has been recorded to HABS/HAER standards
Gateway To The Narrows Trail	Add shuttle stop	Unknown	Further consultation may be necessary
Grotto Trail	Add shuttle stop	Unknown	same as above
Grotto North and South Comfort Stations	Add shuttle stop	Unknown	same as above
Zion Lodge/Birch Creek H.D.	Add shuttle stop	Unknown	same as above

Rehabilitation work on the nature center (HS-90) would be carried out in accordance with the Secretary of the Interior Standards for Rehabilitation (Section 9). This work is necessary to provide space for park employees.

The effect of the addition of shuttle stops at the Grotto, Lodge, and The Narrows trailhead, is unknown. Detailed design drawings of the bus stops (which would include but would not be limited to a shelter, benches, and bus pull-off area) would be prepared during the comprehensive design process. Further consultation with the Utah SHPC would be done at that time to provide the SHPO an opportunity to review and comment on the design drawings.

Removal of the South Campground comfort station would have an adverse effect on the structure. The building would be recorded to the standards of the Historic American Building Survey (HABS) prior to removal.

Impacts of the Proposal.

<u>Structure</u>	<u>Action</u>	<u>Effect</u>	<u>Mitigation</u>
Oak Creek Historic District	Add residences/day care	No adverse effect	Meets Secretary's Standards for Rehabilitation
Nature Center	Realign road to Watchman housing	No adverse effect	same as above
	Add shuttle stop	No adverse effect	same as above
South Amphitheater	Realign access road to amphitheater parking lot	No adverse effect	Vegetative screening

Affected Environment/Environmental Consequences

<u>Structure</u>	<u>Action</u>	<u>Effect</u>	<u>Mitigation</u>
South Campground Comfort Station	Remove	Adverse effect	Has been recorded to HABS/HAER standards
Oak Creek Canal	Abandon and bury OR Install pressurized system in existing ditches	Adverse effect	same as above
South Entrance Sign	Add incoming lane	No adverse effect	
Gateway To The Narrows Trail	Add shuttle stop	Unknown	Further consultation may be necessary
Grotto Trail	Add shuttle stop	Unknown	same as above
Zion Lodge/Birch Creek H.D.	Add shuttle stop	Unknown	same as above
Grotto North and South Comfort Stations	Add shuttle stop	Unknown	same as above

Construction of buildings in the maintenance area and in the Oak Creek housing area would have no adverse effect on the historic district because the new structures would be built under strict design guidelines, which would be compatible with the size, scale, color, materials, and character of the historic buildings, thus meeting the Secretary's Standards.

Realignment of the access road to the Watchman housing area and the addition of a shuttle stop near the nature center would have no adverse effect on that structure. The nature center was originally a component of a concessionaire complex. Only the nature center building remains and the land surrounding the building has been significantly altered since 1973. This area has historically been a heavy visitor-use area, and realignment of the road would have a positive impact on the use and visual orientation of the site. Realignment of the Watchman housing road would allow the access road to the amphitheater parking lot to be relocated. This would result in separating parking lots, reducing conflicting uses, and removing a road that now "cuts" through the area dividing the nature center from the South Campground. Realignment would provide an uninterrupted, "natural" connection to the South Campground. The shuttle stop structure would be designed to meet the Secretary's Standards for Rehabilitation, and the access road to the amphitheater would be screened from view by topography and vegetation.

Conversion of the Oak Creek canal open ditch system to an underground pressurized system may be accomplished by either putting the new pipe in the existing ditches or by destroying the historic ditches by burying them and using new ditches for the pressurized system. Burying the ditches would have an adverse effect, while adapting them would have no adverse effect. Once a decision is made, further consultation would be done with the Utah SHPO.

Because the South Entrance road has been realigned, it has been determined that adding one incoming lane would have no adverse effect on the South Entrance sign.

The effect of the addition of shuttle stops at the Grotto, Lodge, and The Narrows trailhead, is unknown. Detailed design drawings of the bus stops (which would include, but not be limited to, a shelter, benches, and bus pull-off area) would be prepared during the comprehensive design process. Further consultation with the Utah SHPO would be done at that time to provide the SHPO an opportunity to review and comment on the design drawings.

Identification and evaluation of resources that might qualify for listing on the National Register of Historic Places because of cultural landscape values needs to be performed.

Ethnographic Resources

Existing Conditions. The Paiute culture is believed to have entered into southern Utah sometime during the early Pueblo III period (AD 1200-1300) and is still in residence in the surrounding areas. Evidence of this cultural group (lithic and ceramic scatters, rock art) can be found throughout the park.

Southward expansion into Utah's Dixie by Mormon colonists occurred during the mid-1800s. The first settlement of European man in Zion Canyon began in 1862 when Joseph Black discovered suitable farmsites on the flatlands in front of the present Zion Lodge and Grotto picnic area. The settlements of Springdale and Shunesburg, both adjacent to the park's boundary, were founded in 1861 and 1862, respectively.

Little remains of early settlement. When Mukuntuweap (Zion) National Monument was established in 1909, many of the pioneer families were still farming small irrigated plots of land. Once the park acquired national park status in 1919, and its boundary enlarged, these farmsteads were purchased and by 1932, structures associated with pioneer settlement were removed. Irrigation ditches and orchards in the headquarters area and campgrounds are reminders of early settlement efforts.

Impacts of the No-Action Alternative. Ethnographic significance of the area is not known. Therefore, under the no-action alternative, if disturbance to a site(s) is already occurring, it would continue.

Impacts of Alternative One. Same as no-action alternative.

Impacts of Alternative Two. An ethnographic overview and assessment is needed to determine any possible cultural association with park resources. American Indians and other ethnic groups would be consulted during the preparation of that document.

Impacts of the Proposal. Same as alternative two.

VISITOR USE

Existing Conditions

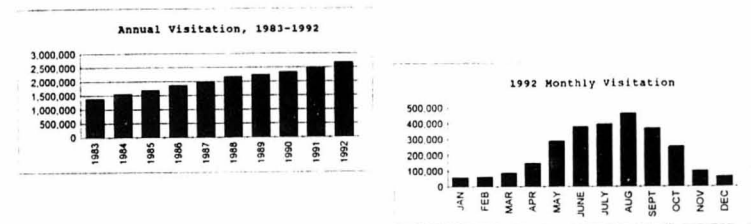
Annual visitation continues to rise (see Visitation graph). In 1992, 2,687,848 people visited Zion National Park. Zion Canyon visitor center has 5,000 or more visitors per day during most of the busy season.

The park experiences a visitation season that begins in March and lasts through October. The increase in March occurs during school spring breaks. Easter vacation brings even larger numbers of visitors, filling both campgrounds. Spring weekends are usually quite busy. Heavy visitation in June, July, and August reflect school vacations across the country and throughout the world. Visitation begins to drop in mid-November depending on weather conditions. Holidays bring additional visitation. An increase in weekend visitation is particularly noticeable during the pleasant spring and fall months, as people from the Las Vegas and Salt Lake City areas make weekend escapes.

Of those visitors responding to a survey in one week of July 1992, 21 percent were international visitors. Of the U.S. citizens visiting the park, 24 percent were from California, 13 percent from Utah, with Nevada and Arizona at 7 percent and 5 percent, respectively. Over 65 percent of visitors are families, with the next largest segment of visitors being couples.

Seventy-three percent of visitors are day-use only and twenty-seven percent are overnight users. Sixty-five percent enter the park at the South Entrance. Over 90 percent of visitor use is concentrated along 25 miles of road, which includes the East Entrance road, the Kolob Canyons road, and the 6.5-mile Zion Canyon scenic drive.

The Zion Canyon visitor center is open every day of the year. According to the 1992 Visitor Services Project Study, sixty-four percent of all park visitors enter the visitor center and spend approximately 24 minutes viewing exhibits and receiving information. Interpretive programs, such as guided walks and evening programs, are offered from mid-march to early November.



Impacts of the No-Action Alternative

Under this alternative, impacts to visitors would include continued and increasing crowding at visitor facilities, along trails, and at parking areas. Depending on their expectations and personal recreational values, this may or may not impact the visitors' experience. Some visitors could curtail their trip because of crowded conditions, others might not be disturbed at all.

Impacts of Alternative One

The visitor would be directly impacted by implementation of this alternative. Shortening service hours at the visitor center would impact the visitor's opportunity to receive orientation and safety messages, and to tour the museum or watch an interpretive production. This information would be have to be found elsewhere in, or outside of the park.

Closing the canyon at peak times would disperse visitors to other parts of the park and/or reduce their length-of-stay in the park because access to trails and visitor facilities up the canyon were closed to them. It is difficult to determine how closing the canyon during peak times would affect the visitors in the canyon because people's expectations and recreational values vary. Some may find the condition more appealing because there would be fewer people around at one time, while others do not mind and may even prefer to have a lot of people around.

Expanding the concessioner's tram system into the campground would allow campers to leave their vehicles parked at their campsite while they see Zion Canyon. The concessioner charges a fee for the shuttle, so campers would probably incur an additional fee over that for camping, should they choose to ride the shuttle. However, their overall experience could be enhanced because they would have an alternate method of access to the canyon.

Requiring reservations for campsites would result in fewer visitors roaming through the campgrounds looking for a site. For an initial implementation period, until the reservation requirement is well known by visitors planning to come to Zion National Park, some visitors would be inconvenienced and upset that they could no longer get a campsite on a first-come, first-served basis. These visitors may decide to simply leave the area and not continue with their visit in the park. However, over time, as the reservation requirement became well advertised, visitors wishing to camp in the park would have the benefit of knowing that with a reservation, they are assured of a campsite. If funding became so tight and park managers closed the campgrounds all together, 381 campsites would be lost and would have to be found outside the park. Commercial camping companies would be affected because under this alternative, commercial camping would not be allowed. The commercial camping companies would have to find camping in areas outside the park.

Restructuring the Junior Ranger Program as an outdoor program would result in the program being cancelled during periods of inclement weather. Based on typical weather conditions over the past few years, the program could be cancelled up to two to three weeks out of the program season. Eliminating this program would permanently remove a learning opportunity for the children visiting the park.

The bike path would provide visitors with another mode of experiencing the park, and would be expected to enhance those visitors' experience, perhaps increasing their length-of-stay. The path would connect to the park entrance, so visitors could bicycle into the park from Springdale, through the headquarters area, and into Zion Canyon. With reduced levels of traffic on the Canyon road, cyclists would be able to leisurely ride to trailheads and viewpoints, without the concern of finding a parking space.

Visitors desiring to picnic would have to find someplace other than near the nature center for this activity.

Impacts of Alternative Two

A mandatory shuttle system could deter some people from spending time in the canyon. However, this percentage is expected to be minimal (see Zion National Park Transportation Study, 1993). An adjustment period is expected until visitors are well informed and aware that they must ride the shuttle to enter Zion Canyon. It is not known what effect the shuttle system would have on the visitor experience in the canyon. Park managers believe that a shuttle system would improve the visitor's experience, however, experiences depend on visitor expectations and values and some may find a less crowded condition more appealing, while others are not bothered with or even prefer to have a lot of people around.

The bike path connecting the South Entrance station to Zion Canyon would provide another mode of transportation for visitors. This would most likely be a benefit and enhance the experience of those who choose to use the path. It would also allow visitors to leave their cars parked at the shuttle staging area, thereby reducing the total number of vehicles in the park at one time.

Expansion of the visitor center would allow the interpretive facility to expand and provide more information to the visitor. This could result in visitors spending more time at this facility.

Removal of the campgrounds would result in the loss of 381 campsites and the opportunity to experience the clear, quiet night skies. Visitors wishing to camp would have to find campgrounds in the surrounding towns, or at USFS and BLM areas. Removal of the campgrounds would impact commercial camping companies because they too would have to find alternative campgrounds for their customers, which may not be as appealing to their customer as camping in a national park.

Restructuring the Junior Ranger Program as an outdoor program would result in the program being cancelled during periods of inclement weather. Based on typical weather conditions over the past few years, the program could be cancelled up to two to three weeks out of the program season. Eliminating this program would permanently remove a learning opportunity for the children visiting the park.

Visitors desiring to picnic near the nature center, would have to find an alternate location.

Providing for a consolidated emergency services facility would reduce response time to incidents, thereby benefitting the visitor.

Impacts of the Proposal

A mandatory shuttle system could deter some people from spending time in the canyon. However, this percentage is expected to be minimal (see Zion National Park Transportation Study, 1993). An adjustment period is expected until visitors become well informed and aware that they must ride the shuttle to enter Zion Canyon. It is not known what effect the shuttle system would have on the visitor's experience while they are in the canyon. Park managers believe that a shuttle system would improve the visitor's experience, however, experiences depend on visitor expectations and values and some may find the less crowded condition more appealing, while others are not bothered by or even prefer to have, a lot of people around.

Relocating the visitor center to the transit staging area would provide the visitor with a number of information, interpretive, and comfort facilities at one location. This would reduce the number of times the visitor must get on and off the shuttle to look for information. Building the picnic area here would make it easily accessible to visitors.

Implementation of a shuttle system based in the Watchman Campground and redesign of the campgrounds would reduce the total number of campsites, and potential campers would have to find camping outside the park. Requiring reservations for campsites would also impact the visitor. There would be an adjustment period until this requirement became widely known by visitors and it would most likely frustrate visitors who make spur-of-the-moment decisions to camp in the park. On the other hand, a portion of the visitors would now know that they had a confirmed campsite and would not have to worry about finding overnight lodging when they get to the park.

The bike path would provide the visitor with another mode of experiencing the park, and would be expected to enhance those visitors' experience, perhaps increasing their length-of-stay. The path would connect to the park entrance, so the visitor could bicycle into the park from Springdale, through the headquarters area and into Zion Canyon. With reduced levels of traffic on the Canyon road, the cyclist would be able to leisurely ride to trailheads and viewpoints, without the worry of finding a parking space would.

Providing for a consolidated emergency services facility would reduce response time to incidents, thereby benefitting the visitor.

SOCIOECONOMIC RESOURCES/REGIONAL LAND USE

Existing Conditions

The population of Washington County continues to increase. Historically, the economy centered around small-scale farming, ranching, logging, and mining, the remnants of which are still visible today. However, improved access, specifically along Interstates 15 and 70 has encouraged vacationers--originating from once-remote metropolitan centers such as Los Angeles, Las Vegas, Salt Lake City, Denver, and Phoenix--to visit the area, and tourism has recently become a major factor in the regional economy. Indicative of the changing economy is the fact that St. George and Cedar City, the region's major urban centers, have both recorded economic upswings--in part, the result of the enterprises that have evolved to serve the needs of visitors. The dominant industries today are trade, services, government, manufacturing, and construction.

The region abounds in natural, cultural, and recreational attractions such as Bryce Canyon and Grand Canyon national parks, Glen Canyon National Recreation Area, Cedar Breaks and Pipe Spring national monuments, the Kaibab and Dixie national forests, and the Dixie and Kanab resource areas. The proximity of the Paiute and Navajo Indian reservations adds to the diversity of the visitor attractions in the area.

Zion National Park is bordered by public and private lands. Isolated parcels of state-owned lands are adjacent to the park. The watersheds and high plateaus are nearly all private, and ranchers are subdividing their land and more and more summer property owners are coming to the area. A number of private, state, and federal tent and RV campgrounds can be found in the region totalling approximately 1,700 campsites.

The town of Springdale, Utah, is just outside the south entrance to the park. The town is home to 300 residents, many of whom own businesses that serve the park visitor. The town encompasses 449 acres of land and is bordered by the national park boundary on the north, east, and west sides. Two hundred of the 449 acres are available for future development. Major land uses are agricultural, residential, and commercial. The commercial district includes fifteen motels and numerous restaurants and retail shops oriented to serving national park visitors. A 458-seat, large-screen theater, with 134 parking spaces, and an 8,500 square-foot retail center is planned for a parcel of land directly across the Virgin River from the Watchman Campground amphitheater. Along the west side of town, the Bureau of Land Management owns an 80-acre parcel of land designated for recreation and public purpose (R & PP). The town's infrastructure is at its limit. The main road through town is narrow, two-lane, and is congested with vehicles during the peak visitor season. The sanitary sewer system is at capacity, and there is a moratorium on future development because of a limited water supply.

Impacts of the No-Action Alternative

If Zion National Park continues operating under current conditions impacts to the surrounding communities would continue to grow. The town of Springdale would be impacted the most. An already overloaded infrastructure would become more overloaded as vehicle counts and visitation numbers rise. Although retailers, hoteliers, and restaurateurs welcome visitors, their facilities simply cannot accommodate the large numbers of people coming to the park. Just as it is inside the park, area for expansion is limited in Springdale. Not only does the amount of visitation tax the town's infrastructure, it also taxes the townspeople and their community atmosphere.

Impacts of Alternative One

The economic impacts to surrounding communities of closing Zion Canyon road during the peak season and eliminating interpretive facilities from the visitor center are not known. Visitors who cannot go up the canyon may spend time in other parts of the park, they may shorten their stay in the park and spend additional time and money in surrounding communities, or they may shorten their trip at the park and leave for other recreation areas in the region. The impacts on tour bus operators are also not known for the same reasons. If the information that has been received at the visitor center could be provided to the visitor on the tour bus, there might be no reduction in visitor satisfaction.

It is not known exactly how many people come to the park in search of a campsite only to find full campgrounds, and then find lodging or spend time in one of the surrounding towns. Because this information is not known, it is not known how the surrounding towns would be impacted were the park to require reservations for campgrounds. Park managers believe that the number would not be significant enough to cause economic hardship to businesses in the area.

Expansion of TWRSS shuttle system would result in additional capital for the purchase of buses and operational costs for operating in the campgrounds. Additional personnel would be needed to operate this route. However, the concessioner charges riders of its present route (from the Zion Lodge to the Temple of Sinawava) and it is expected that they would also charge riders of the proposed route (from the campgrounds through Zion Canyon) to have the opportunity to make a reasonable profit for offering this service. In addition, with the visitor center shortening its hours of operation, there may be an increase in the number of visitors asking for general park and interpretive information at the Lodge, which could impinge on the concession employees' functions.

Impacts of Alternative Two

Locating the shuttle system staging area outside the park would create a stopping and gathering place for all the visitors riding the shuttle. According to the Zion National Park

Transportation Study, 1993, this number is expected to be 80 percent of all park visitors. These visitors would be parking their vehicles in Springdale, riding the shuttle, and then returning to their vehicles. Therefore, they would be in Springdale at least two times during the day, two times that businesses in town would have the opportunity to attract these people to their businesses. However, under the current condition of the town's infrastructure, this could be a strain on services and residents.

According to the Zion National Park Transportation Study, 1993, it can be expected that 20 percent of park visitors would not ride the mandatory shuttle. These visitors may spend time in other parts of the park, they may shorten their stay in the park and spend additional time and money in surrounding communities, or they may shorten their trip at the park and leave for other recreation areas in the region.

Removal of the campgrounds would impact the town of Springdale because campers purchase supplies and groceries there to take back to the campground. The amount spent, however is not known. Removal of the campgrounds would create a void for camping in this area, opening an opportunity for private development of campgrounds. Some visitors that camp in the park take horse rides from Bryce-Zion Trail Rides, and with the closure of the campground, this potential market would be removed and could have impact the concessioner.

Relocation of administrative offices out of the park to a surrounding community would add to the local economy through construction of space, rental of space, and miscellaneous spending by employees.

Under their present concessions contract, TWRSS does not have the right of first refusal on transportation services that originate outside the boundaries of the park. Therefore, implementation of a mandatory shuttle system could provide an economic opportunity for TWRSS or a private contractor. The specifics of what facilities and operational costs the concessioner would be responsible for would be negotiated after approval of this DCP. Therefore, it is not known what the concessioner's investment would be. However, the concessioner would have the opportunity to make a reasonable profit for providing this service. The concessioner would also be responsible for providing housing for the employees required for operating the shuttle system, which it could make a return from on its investment. Under this alternative, the existing TWRSS shuttle rides would be discontinued.

Impacts of the Proposal

Implementation of a shuttle system based in the Watchman Campground, with a secondary staging area in the town of Springdale should have a positive impact on the local economy. Visitors parking at the Springdale staging area would stop in town twice; once to park and once to return to their vehicles. Therefore, local businesses would have two opportunities to attract customers. However, this would also increase the amount of

time visitors would be in town, which could have a negative impact on the town's existing infrastructure, services, and residents.

According to the Zion National Park Transportation Study, 1993, it can be expected that 20 percent of park visitors would not ride the mandatory shuttle. These visitors could spend time in other parts of the park, could shorten their stay in the park and spend additional time and money in surrounding communities, or they could shorten their trip at the park and leave for other recreation areas in the region.

Under the proposal, the amount of camping in the park would be reduced, which would create additional demand on the private sector to provide this service.

New construction of the visitor center, emergency services building, maintenance facilities, housing, and employee facilities, would have a positive impact on the local economy.

Implementation of a mandatory shuttle system could provide an economic opportunity for the concessioner or private contractor. TWRS has a contractual right of first refusal for new and additional services within the park areas including any type of transportation service. Therefore, under this alternative, a determination must be made first as to whether or not TWRS wishes to exercise its option. TWRS does not have first right of refusal for transportation services originating outside the park. The specifics of what facilities and operational costs the concessioner would be responsible for would be negotiated after approval of this DCP. Therefore, it is not known what the concessioner's investment would be. However, the concessioner would be provided the opportunity to make a reasonable profit for providing this service. Should TWRS decide not to operate the shuttle system, the National Park Service could offer the service to another private entity, who would also be afforded the opportunity to make a reasonable profit. Under this alternative, the existing TWRS shuttle rides would be discontinued. The concessioner would also be responsible for providing housing for the employees required for operating the shuttle system, from which they could make a return on their investment.

Cumulative Effects of the Proposal

Long-term effects of the proposal are expected to be positive; a reduction in visitor congestion at visitor-use areas, on roads, and along trails, which in turn should contribute to a more fulfilling visitor experience while in the park; protection of the natural resources the visitor came to see by removing the concentrations of visitors; protection of intangible resources such as clear night skies, quiet, solitude, wilderness values; an overall heightened awareness among park visitors as to the benefits of implementing and riding a shuttle system.

Implementation of a visitor experience and resource protection program would provide park managers with a tool for monitoring visitor-use impacts on the natural and cultural resources and other visitors, and alerting managers that action is needed in order to

remove the impact or protect the resource from further impacts. This is a long-term tool that should help managers respond before resources are severely impacted.

Implementation of the proposal would result in a cumulative irretrievable/irreversible commitment of 10 acres of vegetation (3 percent of the total study area).

A secondary shuttle staging area is expected to have a long-term positive economic impact on the town of Springdale. Construction of facilities is expected to have a short-term, positive impact on the local economy.

Short-term adverse effects of implementing the proposal include confusion and frustration among visitors for an initial "break-in" period while they get familiar with the new requirements of riding the shuttle and having to make reservations to stay in the campgrounds. This is expected to take a year or two until the information is widely communicated. Other short-term effects include auditory impacts to visitors and wildlife during construction activities, possible time delays and detours because of construction, and visual impacts from construction activities.

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CONSULTATION/COORDINATION

To date, the National Park Service has consulted with the following agencies and organizations during the preparation of this document:

Advisory Council on Historic Preservation
Utah State Historic Preservation Officer
Springdale City Council
Springdale Planning Commission
TW Recreation Services
Washington County Travel Council
Zion Natural History Association
U.S. Fish and Wildlife Service
Baca Enterprises, Inc.

A scoping brochure describing project issues and inviting public input was distributed in January 1991. The twelve responses to the brochure were considered during the preparation of this document.

During the planning process, the National Park Service held consultations with the Utah State Historic Preservation Officer and the Advisory Council on Historic Preservation, during which the issues and impacts of the alternatives and proposal were discussed. Both agencies have also had an opportunity to review the draft document. The State Historic Preservation Officer commented that all elements of cultural resources have been taken into consideration and had no other general or technical comments. The Advisory Council on Historic Preservation was satisfied with the plan.

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List of Preparers

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Zion Canyon Headquarters DCP/EA

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(Source Information: Bureau of Land Management, MOSS Export File)

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APPENDICES

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Appendices

APPENDIX 1 - PARK SIGNIFICANCE STATEMENTS

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122

PARK SIGNIFICANCE STATEMENTS

Significance statements capture the essence of the park's importance to our natural and/or cultural heritage. Significance statements describe the importance or distinctiveness of the aggregate of resources in the park, but they are not an inventory of significant resources. The following statements were prepared by park staff to describe the significance of park resources and are based on the basic purpose of the park.

The towering, brilliantly colored sandstone cliffs of Zion provide awe-inspiring scenic experiences found nowhere else.

The geological formations, representing several epochs in the formation of the earth, provide unique educational insights.

Zion National Park contains one of the last mostly free flowing river systems contributing to major canyon formation on the Colorado plateau.

Zion National Park contains outstanding examples of narrow canyon formation processes.

The favorable combination of water, fertile soil, food source, and topography attracted people to the area from prehistoric to contemporary times.

Zion National Park contains remarkable examples of depression-era construction projects: rock culverts, historic trails, buildings, tunnels, and bridges.

Zion National Park's diverse topography and elevations have produced a wide variety of life forms and environments that are unique in this small geographic area.

Zion National Park contains valuable evidence of the interrelationship of the Anasazi and Fremont Indian cultures.

Representative geologic and scenic resources are available to a wide range of people with differing interests and abilities.

The region's clear air and limited light pollution allows unimpaired viewing opportunities of the scenic resources and night sky.

Significant paleontological resources exist in ancient lake beds, volcanic remains, and fossil deposits.

Zion is home to a number of rare, endangered, and endemic species.

Zion National Park contains many mesa tops with undisturbed relic flora populations.

Areas of the park have been relatively undisturbed and present excellent opportunities for scientific research and perpetuation of species.

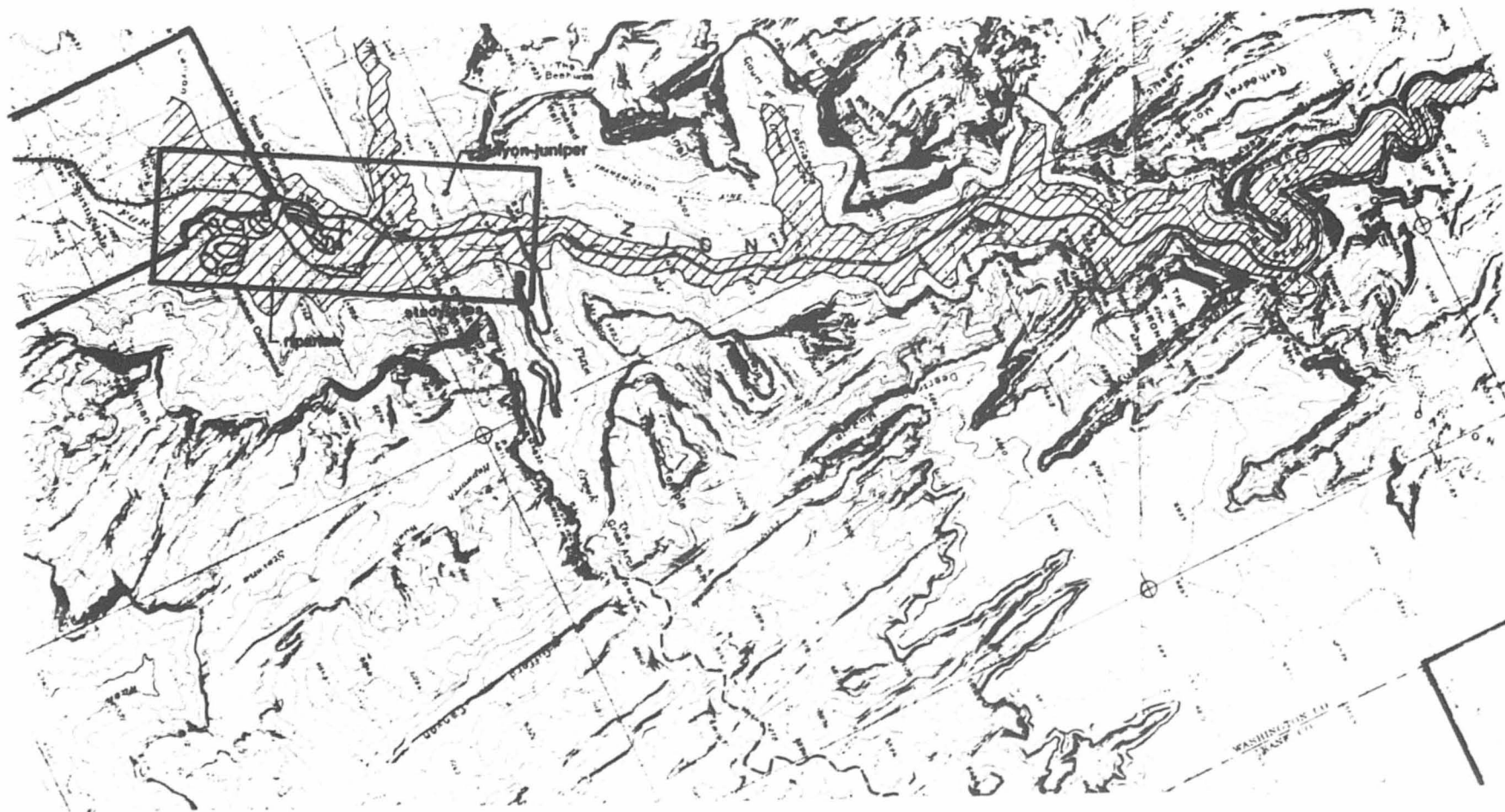
The North Fork and the East Fork of the Virgin River are the agents of canyon erosion and provide unique habitat in the park.

The North Fork and the East Fork of the Virgin River provide a unique recreational experience for park visitors.

The hanging gardens and grottos nourished by groundwater flows support unique varieties of vegetation and endemic fauna and contribute to the outstanding scenic qualities.

APPENDIX 2 - VEGETATION MAP

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0 1 mile



Vegetation
Zion National Park
 United States Department of the Interior
 National Park Service

116 180,106
 Mar 93 RMRO

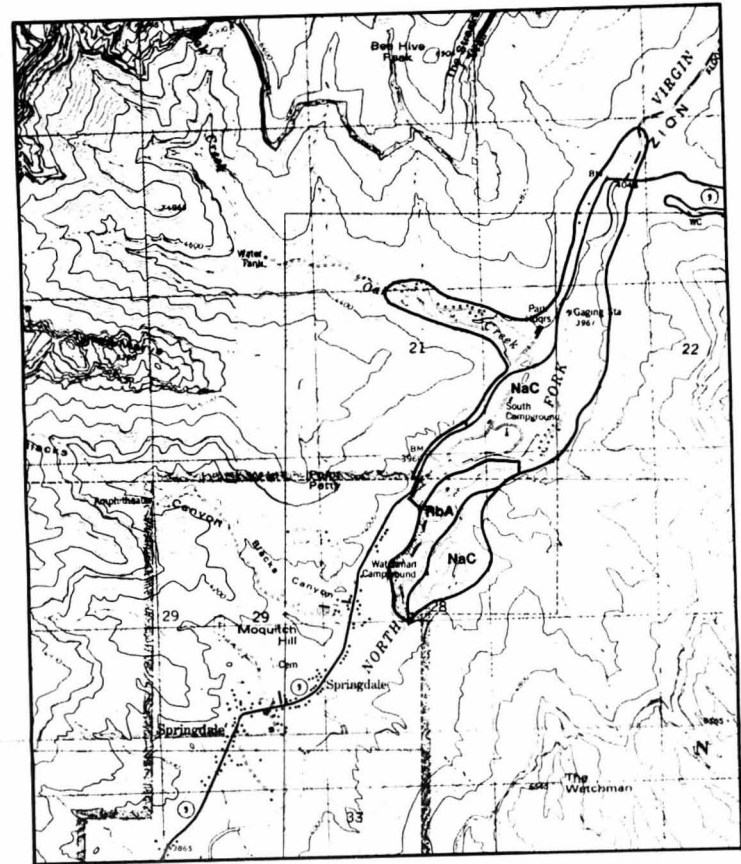
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Appendices

APPENDIX 3 - SOILS MAP

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NaC Napiene silt loam (slight to severe construction limitations)

RbA Redbank silty clay (moderate construction limitations)

Soils
 Zion National Park
 United States Department of the Interior
 National Park Service
 116 (80-108)
 Mar 83 RMRD

131

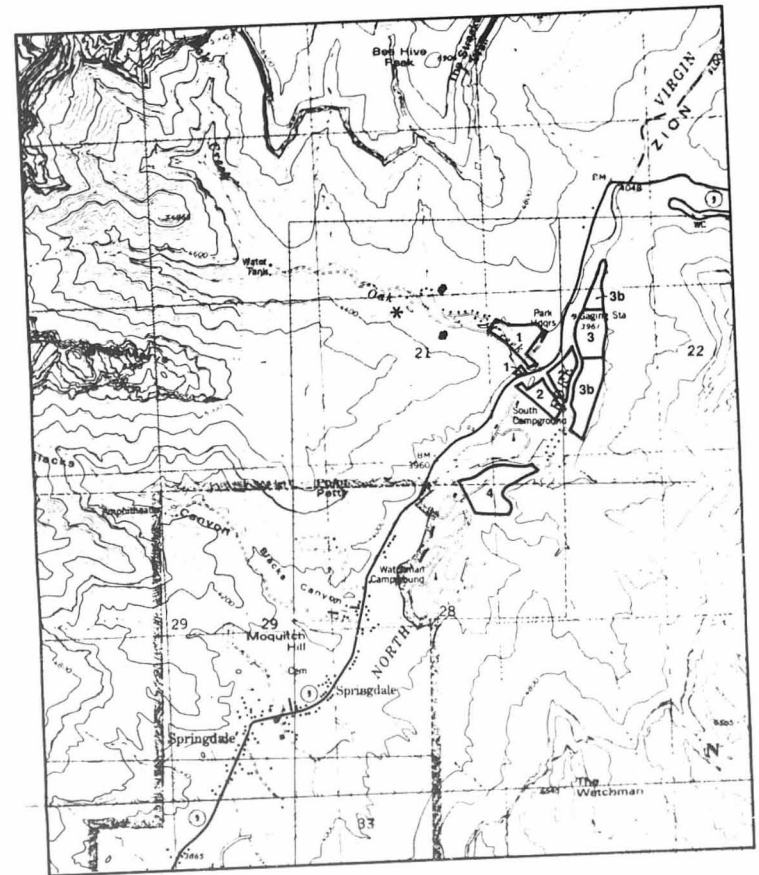
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Appendices

APPENDIX 4 - GEOLOGIC HAZARDS MAP

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135

134

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Appendices

APPENDIX 5 - USFWS LETTER

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United States Department of the Interior
FISH AND WILDLIFE SERVICE

UTAH STATE OFFICE
2060 ADMINISTRATION BUILDING
1745 WEST 1700 SOUTH
SALT LAKE CITY, UTAH 84104-5110

RECEIVED

In Reply Refer To

July 2, 1993

JUL - 7 1993

ZION NATIONAL PARK

MEMORANDUM

TO: Superintendent, Zion National Park, National Park Service, Springdale, Utah

FROM: State Supervisor, Ecological Services, U.S. Fish and Wildlife Service, Salt Lake City, Utah

SUBJECT: Environmental Assessment for Zion Canyon Headquarters

This is in response to your letter of May 24, 1993, and received in this office on June 1, 1993, concerning the preparation of an environmental assessment for Zion Canyon Headquarters to help park managers propose management and development solutions within Zion Canyon. As per your request, an updated list for threatened, endangered, or candidate species that may occur in or near Zion National Park is attached. We have made several additions to the list of species that may occur in the area. If you have any questions or comments, please contact Robert Benton at (801) 975-3630.

Attachment

List of Threatened, Endangered and Candidate Species
for Zion National Park
June 29, 1993

Listed

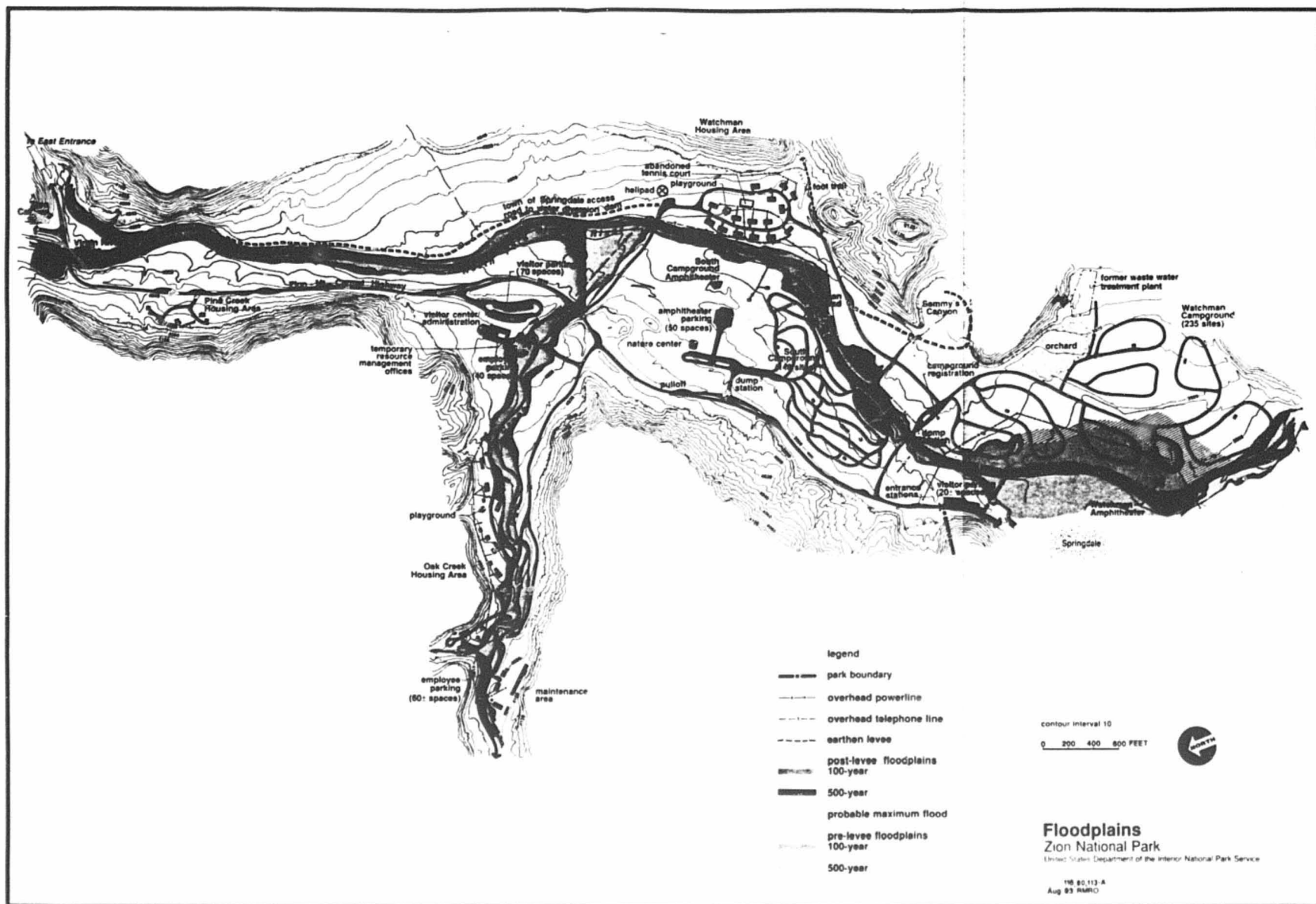
American peregrine falcon	<i>Falco peregrinus anatum</i>	E
Bald eagle	<i>Haliaeetus leucocephalus</i>	E
Desert tortoise	<i>Gopherus agassizii</i>	T
Mexican spotted owl	<i>Strix occidentalis lucida</i>	T

Candidate

Arizona Southwestern Toad	<i>Bufo microscaphus microscaphus</i>	2
Northern Goshawk	<i>Accipiter gentilis</i>	2
Ferruginous Hawk	<i>Buteo regalis</i>	2
Southwestern Willow Flycatcher	<i>Empidonax traillii extimus</i>	1
Flannelmouth Sucker	<i>Catostomus latipinnis</i>	2
Virgin Spinedace	<i>Lepidomeda mollispinis mollispinis</i>	2
Merriam's Kangaroo Rat	<i>Dipodomys merriami frenatus</i>	2
Spotted Bat	<i>Euderma maculatum</i>	2
Nevada Willowherb	<i>Epilobium nevadense</i>	2
Utah Spike-Moss	<i>Selaginella utahensis</i>	2
Jones Golden-aster	<i>Heterotheca jonesii</i>	2
Canaan Daisy	<i>Erigeron canaanii</i>	2
Cliff Jamesia	<i>Jamesia americana</i> var. <i>zionis</i>	2
Paria Scurf-pea	<i>Pediometum pariensis</i>	2
Sand-loving Beardtongue	<i>Pensstemon ammophilum</i>	2
Cedar Breaks Goldenbush	<i>Haplopappus zionis</i>	2
Zion Daisy	<i>Erigeron sionis</i>	2
Zion Tansy	<i>Sphaeromeria ruthiae</i>	2
Chuckwalla	<i>Sauromalus obesus</i>	2
Wet-rock Physa (= Zion Canyon Snail)	<i>Physella</i> (= <i>Physa</i>) <i>zionis</i> (Pillsbry, 1905)	2

APPENDIX 6 - FLOODPLAINS MAP

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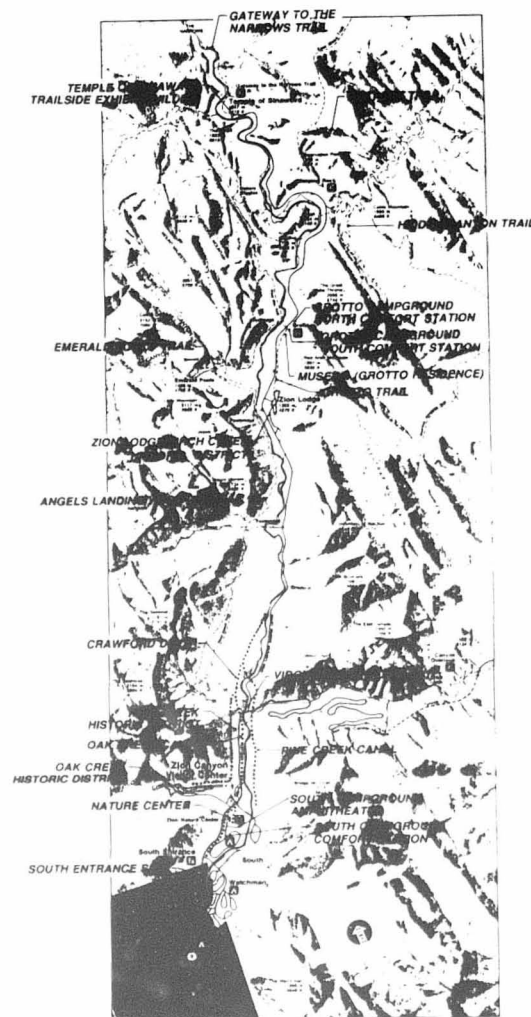


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Appendices

APPENDIX 7 - HISTORICAL STRUCTURES MAP

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Historic Structures
 Zion National Park
 United States Department of the Interior
 National Park Service
 1966
 Scale 1:50,000
 Contour 100 Feet

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Appendices

APPENDIX 8 - BUILDING SQUARE FOOTAGE REQUIREMENTS

BUILDING SQUARE FOOTAGE REQUIREMENTS

MAINTENANCE COMPLEX

Function	Existing SF	Additional SF Needed
Carpenter shop	1,500	1,500
Plumbing shop	750	0
Electrician's shop	250	250
General covered storage	3,000	1,000
Sign storage	250	250
Roads and trails shop	500	500
Small vehicle/equipment shop	2,500	0
Auto/equipment repair shop	2,000	2,000
Covered rolling stock garage		
25 vehicles	0	9,000
Paint Storage	200	0*
Explosives storage	0	100
Vehicle wash rack	0	800*
Maintenance offices	400	400
Maintenance work room	0	300
Employee meeting/break room	400	600
Rest rooms with 50 lockers	0	380
Procurement offices	350	250
Warehouse storage	1,500	0
Subtotal	13,600	17,330
Less square footage to be vacated:		
Firehouse	1,600	
TOTAL		15,730

* To be built to EPA standards

Storage space needed outside maintenance complex:

Excess property storage	600
Bulk storage (sand, gravel, stone)	20,000
Recycling station	1,000

VISITOR CENTER

Based on figures from site visit by DSC Architect, August 1992 to determine expansion needs.

Function	SF
Lobby	8,000
ZNHA book sales	2,400
Museum	3,200
Auditorium	2,300
Rest rooms	1,600
Mechanical (7 percent)	1,225
TOTAL	18,725

EMERGENCY SERVICES BUILDING

Function	SF
Garages	
1 fire truck	720
2 ambulances	480
Fire cache	200
Emergency rescue cache	150
Ranger fitness room/showers (alternative two only)	860
First-aid	100
Rest rooms	100
Animal impound	300
Mechanical (5 percent)	145
Structural/circulation (25 percent)	727
TOTAL	3,782

COMMUNITY CENTER

Function	SF
Meeting room (100 people)	700
Fitness room (10-20 people)	800
Showers (1 men's, 1 women's)	60
Rest rooms (2 men's, 2 women's)	200
Storage	150
Kitchen prep area	80
Mechanical (5 percent)	100
Structural/circulation (25 percent)	500
TOTAL	2,590

DAY-CARE FACILITY

Function	SF
Open play room (40 persons)	1,400
Kitchen	150
Rest rooms (1 girls', 1 boys')	200
Storage	150
Mechanical (5 percent)	95
Structural/circulation	475
TOTAL	2,475